PROJECT DESIGN MANUAL

Bid Set
SPECIFICATIONS

City of Sonoma
Valley of The Moon Nursery School
ADA & Maintenance Improvements
Sonoma, California

April 4, 2016

LICENSED ARCHITECT
DAVID B. RAPP
NO. C23464
REN. JANUARY 31, 2017
STATE OF CALIFORNIA

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SECTION 00 00 2

PROJECT DIRECTORY

Project:	Valley of The Moon Nursery School
Location:	136 Mission Terrace, Sonoma, California 95476
Owner:	City of Sonoma 1 The Plaza Sonoma, California 95476 Wayne Wirick Jr. Phone: (707) 933-2211 wayne@sonomacity.org
Architect:	STRATAap PO Box 1207 Sonoma, CA 95476 David B. Rapp, AIA Phone: (707) 935-7944 drapp@strataap.com
Civil Engineer:	EBA Engineering 825 Sonoma Avenue, Suite C Santa Rosa, California 95494 Damon Morelli, P.E., LEED AP, QSD/QSP Phone: (707) 544-0784
Mechanical Engineer:	15000 Engineers 2901 Cleaveland Avenue, Suite 204 Santa Rosa, California 95403 Matt Torre, P.E. Phone: (707) 577-0363

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The specification sections in this project manual may either be in the form of written specifications or product literature. Whether the section contains product literature or written specifications, it is assumed that the work of that section shall be performed in accordance with industry standards and applicable codes. Regardless of how the specification sections are provided they are part of the Contract Documents and as such are complementary, and what is required by one shall be as binding as if required by all.

INVITATION TO BID

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INVITATION TO BID

Bid Invitation. Sealed proposals will be received by the City Clerk of the City of Sonoma, California, at City Hall, No. 1 The Plaza, Sonoma, California, until **Thursday, June 30, 2016 at 2:00 PM** at which time, they will be publicly opened and read aloud at the City Hall Conference Room located at No. 1, The Plaza, Sonoma, California for the Valley of the Moon Nursery School ADA & Maintenance Improvement Project**.**

Bid Proposals. Bid proposals for the above project must be submitted on the forms contained in the Contract Documents and Specifications and shall be enclosed in a sealed envelope marked:

Attention:	**City Clerk**
Bid Proposal for:	**Valley of the Moon Nursery School ADA & Maintenance Improvement Project.**

General Description of Work. In general, the Work includes, but is not limited to, the following:

1. Provide new ADA parking and path of travel.
2. Interior ADA modifications.
3. Removal and replacement of concrete walks and ramps
4. Cleaning and caulking of existing exterior cracks.
5. Removal and replacement of exterior shed roof.
6. Interior and exterior painting.
7. Casework

Preliminary Cost Estimate. The preliminary cost estimate for the work is $98,786
.

Project Site. The project site is located at **136 Mission Terrace, Sonoma, California**.

Completion of Work. Completion of the Work must be achieved within **35 calendar days** after the commencement date stated in the Notice to Proceed issued by the City.

Mandatory Pre-Bid Conference. A mandatory pre-bid conference and walkthrough at the project site is scheduled on **Thursday, June 16, 2016 at 2:00 PM**. The object of such mandatory pre-bid conference and walk-through is to acquaint Bidders with the site conditions. Failure by a Bidder to attend the mandatory pre-bid conference and walk-through shall disqualify any Bid submitted by such non-attending Bidder and shall bar award of the Contract to any such Bidder.

Obtaining Contract Documents. The Contract Documents may be obtained from the City at Sonoma City Hall, #1 The Plaza, Sonoma, California, upon payment of a nonrefundable $50.00 for each set of Contract Documents. To request Bid Documents and Specifications by telephone, call the Development Services Department at (707) 938-3681. An additional nonrefundable $10.00 per set will be charged for mailing Bid Documents and Specifications. Please make all checks payable to the City of Sonoma. Partial sets of the Contract Documents will not be available for purchase. All Specifications and Drawings included as part of such Contract Documents are hereby made a part of this Invitation to Bid.

The Contract Documents may also be viewed and downloaded at no cost from the City's website at http://www.sonomacity.org/Businesses/Resources/Bid-Solicitations.aspx. Please note that the documents downloaded from the City's web site may not include addenda issued after the download occurred and may not print at the proper scale. After downloading the bid documents,

the contractor shall be fully responsible for obtaining all addenda and printing the documents at the proper scale. To obtain addenda, the contractor must contact City Hall and ask to be placed on the plan holder's list for the project.

Bidders Security. Each Bid shall be accompanied by a Bidder's security as provided in the Contract Documents.

Contractor's License Classification. In accordance with the provisions of California Public Contract Code Section 3300, the City has determined that the Contractor shall possess a valid **Class B** Contractors license at the time that the bid is submitted. Failure to possess the specified license at the time of bid submittal may render the Bid non-responsive, may bar award of the Contract to said Bidder and shall subject the Bidder to penalties under the Business & Professions Code.

California Prevailing Wage Rate Required. In accordance with the provisions of California Labor Code Sections 1770, 1773, 1773.1, 1773.6 and 1773.7, as amended, the Director of the Department of Industrial Relations has determined the general prevailing rate of per diem wages in accordance with the standards set forth in Section 1773 for the locality in which the Work is to be performed. A copy of said wage rates is on file at the office of the City Clerk of the City of Sonoma and also online at http://www.dir.ca.gov/DLSR. The contractor to whom the Contract is awarded and any subcontractor shall pay not less than said specified rates to all workmen employed by them in the execution of the Work and shall post the determination in a prominent place at the job site

Contractor and Subcontractor Registration with the Department of Industrial Relations. Pursuant to California Labor Code Section 1771.1(a), a contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in Section 1720 of the Labor Code, unless currently registered and qualified to perform public work pursuant to Section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

Required Employment of Apprentices on Public Works. The contractor to whom the Contract is awarded and any subcontractor shall comply with the requirements of CA Labor Code 1777.5 and Title 8 of the California Code of Regulations, Section 230.1 pertaining to the employment of apprentices on public works.

Retainage from Payments. The Contractor may elect to provide for the substitution of securities for any moneys which would otherwise be withheld by the City to ensure performance under the contract or may request the City to make payment of retentions earned directly to an escrow agent subject to the provisions of Section 22300 of the Public Contracts Code.

City Business License Required. The successful bidder who is awarded the contract, all subcontractors and all suppliers delivering materials will be required to obtain a City of Sonoma Business license before commencing work on this project.

Insurance. A signed statement shall be provided by each bidder or preferably from the bidder's insurance carrier stating that all of the insurance requirements and exact endorsements stipulated in the Construction Contract have been reviewed and can be met. The successful bidder must provide Certificates of Insurance on the forms and with the required coverages and endorsements set forth in the contract documents and as further prescribed by the City.

Electronic Submittal of Bids Not Allowed. Bids submitted or transmitted electronically or by facsimile machine will not be accepted.

City's Rights Reserved. The City Council reserves the right to reject any and all bids or to waive any defects or irregularity in the bidding.

Questions regarding this Invitation to Bid should be directed to Wayne Wirick, Development Services Director/Building Official, at 707-938-3681 or by e-mail at wwirick@sonomacity.org.

CITY: Gay Johan Date: May 27, 2016
Assistant City Manager / City Clerk, City of Sonoma

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INSTRUCTIONS TO BIDDERS

1. Bid Forms

The City may consider informal any Bid not prepared and submitted in accordance with the provisions hereof and may waive any informalities or reject any and all Bids.

All Bids must be made upon the blank forms contained in these Bid Documents. Any Bid submitted without such forms being fully completed may be deemed to be non-responsive and may cause its rejection. All Bids must give the proposed unit prices and total amounts and must be signed by the bidder. In case of disagreement between the unit prices and the total amounts, the unit prices and corrected totals will be considered as representing the bidder's intentions. **Bids must be completely filled out in ink or typewritten and shall be enclosed in a sealed envelope marked:**

"BID FOR: **Valley of the Moon Nursery School ADA & Maintenance Improvement Project."**

and addressed to the City Clerk, Sonoma City Hall, #1 The Plaza, Sonoma, California, 95476.
One set of Bid documents on the forms provided is required to be submitted. Fax and other electronically transmitted bids will not be accepted.

2. Approximate Estimate

The quantities, estimates and scope of work given in the Invitation to Bid and the Bid are approximate only, being given as a basis for the comparison of bids, and the City does not, expressly or by implication, agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the amount of any class or portion of the work, or to omit portions of the work, as may be deemed necessary or advisable by the City.

3. Examination of Plans, Specifications, Contract Documents and Site of Work

Each Bidder by making a Bid represents that it has familiarized itself with the nature and extent of the Laws and Regulations affecting the Work, including costs, progress or performance of the Work, and has made such independent investigations of the Project Site as the Bidder deems necessary, and that the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for the full and complete performance of the Work.

4. Addenda and Interpretations

No interpretation of the meaning of the Plans, Specifications or Contract Documents will be made to any bidder orally. Every request for such interpretation shall be in writing addressed to the City, and to be given consideration must be received at least five days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the Plans, Specifications and/or Contract Documents which, if issued, will be sent to all prospective bidders (at the respective addresses furnished for such purposes), not later than three days prior to the date fixed for the opening of bids. Failure of any bidder to receive any such addendum shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the Specifications and Contract

Documents.

5. Rejection of Bids

Bids may be rejected if they show any alteration of form, additions not called for, conditional bids, incomplete bids, obviously unbalanced prices, erasures or irregularities of any kind. The City reserves the right to reject any and all bids. A bid may be rejected by the City Council if the bid is determined to be unresponsive or the bidder is determined to be non-responsible. In the event that a bid or bidder is rejected on the basis that a bid is unresponsive or the bidder is non-responsible, the bidder may request a protest hearing with the City Council provided that the request is made in writing and submitted to the City Clerk within 5 business days of the date rejected.

6. Disqualification of Bidders

More than one Bid from an individual, firm, partnership, corporation or combination thereof under the same or different names will not be considered. Reasonable grounds for believing that any individual, firm, partnership, corporation or combination thereof is interested in more than one Bid for the work contemplated may cause the rejection of all Bids in which such individual, firm, partnership, corporation or combination thereof is interested. If there is reason for believing that collusion exists among the bidders, any or all Bids may be rejected. Bids in which the prices obviously are unbalanced may be rejected. No person, firm, partnership, corporation or association shall be allowed to make or file or be interested in more than one Bid whether under the same or different names.

7. Bidder's Security

All bids shall be presented under sealed cover and accompanied by one of the following forms of bidder's security: cash, certified check or bidder's bond. Bonds shall be duly executed by a responsible corporate surety, authorized to issue such bonds in the State of California, and secured through an authorized agent with an office in California.
The security shall be in an amount equal to at least 10% of the bid amount. The check or bid bond shall be given as a guarantee that the bidder to whom the contract is awarded shall execute the contract documents and shall provide the required payment and performance bonds and insurance certificates as specified therein within ten (10) days after the notification of the award of the contract. A bid will not be considered unless one of the forms of bidder's security is enclosed with it.

8. Designation of Subcontractors

Any subcontractor doing work in excess of 1/2 of 1% of the total bid price or $10,000, whichever is greater, shall be designated in the Bid in accordance with Section 4100, et seq., of the Public Contract Code.

9. Registration with the Department of Industrial Relations

Pursuant to California Labor Code Section 1771.1(a), a contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Section 1725.5.

10. Withdrawal of Bid

Any bid may be withdrawn at any time prior to the time fixed in the public notice for the opening of bids only by written request for the withdrawal of the bid filed with the City. The

request shall be executed by the bidder or his duly authorized representative. The withdrawal of the bid does not prejudice the right of the bidder to file a new bid. Whether or not bids are opened exactly at the time fixed in the public notice for opening bids, a bid will not be received after that time, nor may any bid be withdrawn after the time fixed in the public notice for the opening of bids except in accordance with Public Contract Code Sections 5100 *et seq*.

11. Project Administration

All communications relative to this Work prior to opening of Bids shall be directed to the City at the location listed below:

Wayne Wirick Jr., Development Services Director / Building Official
City of Sonoma
#1 The Plaza
Sonoma, CA 95476

Phone (707) 938-3681
Fax (707) 938-8775
E-mail wwirick@sonomacity.org

12. Deadline for Technical Questions

The deadline for submitting technical questions prior to bid opening is **5:00 PM on Monday, June 20, 2016**. Any questions relative to the bid shall be in writing and directed to the Architect or designee at the following location:

STRATAap
ATTN: David B. Rapp, AIA
PO Box 1207
Sonoma, CA 95476
Phone: (707) 935-7944
Fax: (707)935-6618
drapp@strataap.com

13. Public Opening of Bid

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

14. Bids to Remain Open

Each Bid shall remain open, and each Bidder shall guarantee its total Base Bid, for a period of sixty (60) calendar days from the date of bid opening.

15. Relief of Bidders

Attention is directed to the provisions of Public Contract Code Sections 5000 et seq., concerning relief of bidders and in particular to the requirement therein, that if the bidder claims a mistake was made in his bid, the bidder shall give the City written notice within five days after the opening of the bids of the alleged mistake, specifying in the notice in detail how the mistake occurred.

16. City's Rights Reserved

The City reserves the right, at its sole discretion at any time, to withdraw its invitation for Bids, to accept or reject any or all Bids, to waive any informality or irregularity in a Bid, to act as the sole judge of the merit and qualifications of submitted Bids, and/or to make awards to the lowest responsible Bidder as it may best serve the interest of the City, all without liability to any Bidders or other parties. In addition, the City reserves the right, exercisable in its sole discretion at any time prior to its issuance of the Notice to Proceed, to withdraw the solicitation of Bids being made hereby (whether before or after the opening of the Bids) and to revoke any award of the Contract (if such award has been made at such time), without any liability to any Bidders or the parties, including, without limitation, the Bidder to whom the Contract was awarded. In such event, the City shall promptly return the Bid securities accompanying the Bids to the respective Bidders whose Bids they accompany.

17. Evidence of Responsibility

Upon the request of the Owner, a bidder shall submit promptly to the Owner satisfactory evidence showing the bidder's financial resources, the bidder's experience in performing public works projects of the type of work being required by the Owner, the bidder's organization and availability to perform the work and any other required evidence of the bidder's qualifications to perform the proposed contract. The Owner may consider such evidence before making its decision awarding the proposed contract. Failure to submit evidence of a bidder's responsibility to perform the proposed contract may result in rejection of the bid.

18. Experience of Contractor

Bidders are hereby notified that each Bidder submitting a Bid must have successfully completed not less than three (3) comparable projects at least one (1) of which being a public works contract with a public entity, and all of which must have been completed within the last seven (7) years, employing personnel skilled in the processes and operations indicated in the Contract Documents.

19. Experience of Subcontractors

In general, all subcontractors proposed by each Bidder shall have sufficient experience and expertise to perform the applicable portion of the Work. Bidders are hereby notified that certain portions of the Work are considered by the City to be highly technical in nature, thereby requiring a high degree of skill and experience to be properly performed. Accordingly, the City is requiring that the subcontractors proposed by each Bidder to perform such portions of the Work have a level of experience more particularly described in the Project Specifications.

20. Denial of Right to Bid.

Contractors or Subcontractors who have violated state law governing public works shall be denied the right to bid on this public work contract pursuant to California Labor Code Section 1777.7.

21. Execution of Contract

The successful bidder shall, within ten (10) calendar days of notice of award of the contract, sign and deliver to the Owner the executed contract along with the bonds and certificates of insurance required by the Contract Documents. In the event the bidder to whom an award is made fails or refuses to execute the contract within ten (10) calendar

days from the date of notification that the contract has been awarded to the bidder, or fails to provide the bonds and certificates as required, the Owner may declare the bidder's bid deposit or bond forfeited as damages caused by the failure of the bidder to enter into the contract, and may award the work to the next lowest responsible responsive bidder, or may reject all bids and, at its sole discretion, call for new bids.

22. Project Funding

It is anticipated that the funds used by the City to pay for the performance of the Work will include funds received from the City of Sonoma's General Fund – Long-Term Building Maintenance Fund. In addition to complying with all other applicable Laws and Regulations, the Bidder to whom the Contract is awarded shall be obligated to comply with all applicable Laws and Regulations arising from the fact that a portion of the funds used to pay for the performance of the Work are derived from such sources.

23. Statement of Insurance Coverage

Each bidder or preferably the bidder's insurance carrier shall submit a signed statement stating that all of the insurance requirements and exact endorsements stipulated in the Construction Contract have been reviewed and can be met.

24. Underground Utilities

Information and data reflected in the Contract Documents with respect to underground utilities at or contiguous to the Project Site is based upon the best information acquired prior to the development of the plans and specifications. The City and Architect do not assume responsibility for the accuracy or completeness thereof.

25. Telephones

Bidders are hereby notified that no public telephones are available at City Hall and that no private telephones will be made available to Bidders by the City.

26. Modifications and Unauthorized Alternative Bids

Unauthorized conditions, limitations or provisos attached to the Bid will render it informal and may cause its rejection as being non-responsive. The completed Bid forms shall be without interlineations, alterations or erasures in the printed text. Alternative Bids will not be considered unless called for.

27. Worker's Compensation Requirement

Each Bidder is hereby made aware that if awarded the Contract, the bidder shall be subject to the worker's compensation requirements of Section 3700 of the California Labor Code and will be required to provide workers' compensation certification in a form acceptable to the City.

28. Non-Collusion Affidavit

The bidder must complete, sign and submit the Non-Collusion Affidavit Form.

29. Bid Documents

As used in the Instructions, the term "Bid Documents" shall mean the Contract Documents, consisting of the following:

a. INVITATION TO BID

b. INSTRUCTIONS TO BIDDERS

c. BID FORM

d. DOCUMENTS TO BE SUBMITTED WITH BIDS

e. AGREEMENT BETWEEN CITY AND CONTRACTOR

f. GENERAL CONDITIONS

g. INSURANCE AND BOND FORMS

h. PROJECT MANUAL (SPECIFICATIONS); prepared by STRATAap, dated April 4, 2016.

a. DRAWINGS prepared by prepared by STRATAap, dated April 4, 2016.

b. ALL ADDENDA TO THE FOREGOING AS MAY BE ISSUED BY THE CITY PRIOR TO BID OPENING.

The Contract Documents also consist of any Modifications issued after the execution of the Agreement; however, such Modifications are not part of the Bidding Documents since such Modifications only arise following the award of the Contract.

30. Municipal Business License Required

In addition to all other requirements set forth in the Contract Documents, the Bidder to whom the Contract is awarded and all subcontractors performing work or delivering supplies or materials for the project must obtain and keep in force throughout the progress of the Work, a municipal business license issued by the City of Sonoma. Concurrently with delivery of the executed Agreement to the City, the Bidder to whom the Contract is awarded shall provide proof of such license.

31. Insurance Requirements

Prior to execution of the Contract for Construction, the contractor must submit completed insurance forms with required endorsements as provided in the General Conditions for the Contract for Construction within ten (10) calendar days following the Notice of Award of Bid.

32. Payment and Performance Bonds

The successful bidder shall be required to furnish performance and payment bonds in the forms included with the contract documents. All bonds shall be written by corporate sureties duly licensed to transact surety business in the State of California. The payment bond shall meet all requirements of Civil Code Sections 9550 through 9566.

33. Compliance with the Americans with Disabilities Act

The successful bidder who is awarded the contract and all subcontractors will be required to comply with the requirements of the Americans with Disabilities Act.

34. Amendments and Postponement

The City reserves the right to revise or amend the bid date or the specifications up to 72 hours prior to the time set for the opening of bids. Such revisions and amendments, if any, shall be made in writing and shall be faxed to all plan holders.

35. Bid Protest.

Any bid protest must be in writing and received by the City of Sonoma City Clerk, # 1 the Plaza, Sonoma, CA before 5:00 p.m. no later than three (3) business days following bid opening and must comply with the following requirements:

a. The bid protest must contain a complete statement of the basis for the protest, and all supporting documentation.

b. The party filing the protest must have actually submitted a bid for the Project. A Subcontractor of a bidder submitting a bid for the Project may not submit a bid protest. A bidder may not rely on the bid protest submitted by another bidder, but must timely pursue its own protest.

c. The protest must refer to the specific portion or portions of the Contract Documents upon which the protest is based.

d. The protest must include the name, address and telephone number of the person representing the protesting bidder if different from the protesting bidder.

e. The bidder filing the protest must concurrently transmit a copy of the bid protest document and all supporting documentation, as required above, to all other bidders with a direct financial interest which may be affected by the outcome of the protest, including all other bidders who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.

f. The bidder whose bid has been protested may submit a written response to the bid protest. Such response shall be submitted to the City no later than 5 p.m., no later than two (2) business days after the deadline for submission of the bid protest or other receipt of the bid protest, whichever is sooner, and shall include all supporting documentation. Such response shall also be transmitted concurrently to the protesting bidder and to all other bidders who appear to have a reasonable prospect of receiving an award depending upon the outcome of the protest.

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

h. If the City determines that a protest is frivolous, the protesting bidder may be determined to be non-responsible and that bidder may be determined to be ineligible for future contract awards by the City.

For purposes of this section, a "business day" means a weekday during which the City's office is open and conducting business.

36. Bid Execution

Bids by corporations must be executed in the corporate name by the president, vice president, or other corporate officer. Such Bid shall be attested by the secretary or assistant secretary, and with the corporate seal affixed. The corporate address and site of incorporation must appear below the signature.

Bid by partnerships must be executed in the partnership name and be signed by a managing partner and his/her title must appear under the signature and the official address of the partnership must appear below the signature.

Bids by joint venture must be executed in the joint venture name and be signed by a joint venture managing partner and his/her title must appear under the signature and the official address of the joint venture must appear below the signature.

BID FORM

Bid Submitted By: _____
Company Name

Submit To: City Clerk, City of Sonoma, #1 the Plaza, Sonoma, CA, 95476.

To the City Council of the City of Sonoma, California:

Base Bid

Pursuant to the City of Sonoma's Invitation to Bid dated May 27, 2016, the undersigned hereby certifies that they have carefully examined and are familiar with the Bidding and Contract Documents entitled:

Valley of the Moon Nursery School ADA & Maintenance Improvement Project
136 Mission Terrace, Sonoma, California 95476

and the conditions affecting the Work described therein, that he/she has attended the Pre-bid walk-through, and is familiar with the Project. Having made the necessary examinations, the Contractor proposes and does hereby agree to furnish all labor, materials, equipment, and services necessary to complete the Work described in and in accordance with the Contract Documents for the **Valley of the Moon Nursery School ADA & Maintenance Improvement Project**. The undersigned agrees to complete all work for a firm price,

lump sum Base Bid amount of_____

_____ (written) and 00/100 dollars

($_____) and further agrees to complete the Work within **35** calendar days from the date stated in the Notice to Proceed.

Scheduled Alternates

If the bid documents include Scheduled Alternates (Additive and/or deductive items), the determination of the apparent low bidder will be based on the total of the Base Bid plus the sum of all Scheduled Alternates. The City reserves the right to delete any or all Scheduled Alternates from the final contract. The City retains the right to add to or deduct from the contract any of the additive or deductive items included in the bid solicitation

Note that no additional time will be provided for completion of the Scheduled Alternates. Alternate costs to the Base Bid amounts:

Alternate #	**Description of Alternates**	**Lump Sum Price** *Indicate Add (+) or Subtract (-)*

BIDDER MUST COMPLETE THIS SHEET

Unit Prices for Changes in Work:

The following unit prices for the specified items will be used to determine added or deductive changes to the Contract Sum because of changes in the Work during the term of the Contract.
Unit prices include all costs for performance of Work, including costs of materials and equipment, labor, overhead, and profit.

Category of Work	Unit of Measure	Unit Price

Time for Completion & Liquidated Damages:

Following acceptance of this Bid by the City and signing of the Contract for Construction, the undersigned agrees to commence said work and to diligently prosecute the same to completion within 35 calendar days; and further agrees to pay, as liquidated damages, the sum of $200 for each consecutive calendar day of delay in completing said work or any portion thereof in excess of said time limits and any authorized time extensions. The contract time represents an aggressive duration for the scope of work contained in the Contract which reflects the City's operational requirements. Bid Proposals shall include sufficient allowance for premium time (overtime or weekend work) to accomplish the work in accordance with the specified duration and the City's operational requirements. The actual occurrence of damages and the actual amount of the damages which the City would suffer if the Work is not completed within the Contract Time would be impracticable and extremely difficult to determine. Damages the City would suffer in the event of delay include, but are not limited to, loss of the use of the Work, costs of administration, inspection, supervision and the loss suffered by the public within the City. Accordingly, the parties agree that the amount herein set forth is a reasonable estimate of the damages which the City will incur upon failure of the Contractor to complete the Work within the Contract Time

City's Right to Reject Bids.

It is further understood and agreed that the City reserves the right to reject any and all Bids and to waive any informalities in the bidding; and that no verbal agreement or conversation with any officer, agent or employee of the City either before or after the execution of the Contract, shall affect or modify any of the terms or obligations of this Bid.

Addenda

The undersigned acknowledges receipt of the following addenda:

Addendum #	Date

BIDDER MUST COMPLETE THIS SHEET

Bidder Information (Please Type or Print)

Bidder's Name :	
Business Street Address :	
City, State, Zip:	
Business Phone No.: Business Fax No.:	
Business E-Mail.:	
State Contractors License #: Primary Class: Expiration Date:	
Supplemental Classifications, if any:	
Federal I.D. or SS #:	
Type of Organization: (Partnership, Individual or Corp.)	
Name of person who Attended Mandatory Bid Walkthrough:	

NOTICE TO BIDDER: Notice is hereby given to the Contractor that any bidder or contractor not properly licensed in accordance with the laws of the State of California at the time the bid is submitted shall be subject to all legal penalties imposed by law, including, but not limited to, any appropriate disciplinary action by the Contractors State License Board.

Authorized Signature

Title

Date

If a corporation, provide corporate seal above

NOTICE TO BIDDER:

Notice is hereby given to the Contractor that any bidder or contractor not properly licensed in accordance with the laws of the State of California at the time the contract is awarded shall be subject to all legal penalties imposed by law, including, but not limited to, any appropriate disciplinary action by the Contractors State License Board.

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BIDDER'S BOND - CITY OF SONOMA

KNOW ALL MEN BY THESE PRESENTS,

That we,_____as PRINCIPAL

and_____as SURETY,
are held and firmly bound unto the City of Sonoma in the penal sum of TEN PERCENT (10%) OF THE TOTAL AMOUNT OF THE BID of the Principal of above named, submitted by said Principal to the City of Sonoma for work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, to the City of Sonoma, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by

these presents. In no case shall the liability of the surety hereunder exceed the sum of $_____
_____.

THE CONDITION OF THIS OBLIGATION IS SUCH
That whereas the Principal has submitted the above-mentioned bid to the City of Sonoma as aforesaid, for certain construction specifically described as follows, for which bids are to be opened at Sonoma,

California, on the _____ day of _____, for the

_____ project.

NOW THEREFORE, if the aforesaid Principal is awarded a contract and, within the time and in the manner required under the specifications, after the prescribed forms are presented to him for signature, enters into a written contract, in the prescribed form, in accordance with the bid, and files two bonds with the City of Sonoma, one to guarantee faithful performance and other to guarantee payment for labor and materials, as required by law, and provides the evidence of insurance required by the City, then this obligation shall be null and void, otherwise it shall remain in full force and virtue.

IN WITNESS WHEREOF, we have hereunto set our hands and seal this

_____day of _____, 201___.

_____
Principal

_____
Surety

_____

_____
Surety Address

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Bidders Name: _____

Project Name: Valley of the Moon Nursery School ADA & Maintenance Improvement Project

LIST OF SUBCONTRACTORS

In accordance with Section 4104 of the California Public Contract Code, each Bidder shall include in its Bid the following:

(i) the name and the location of the place of business, and the California contractor license number of each subcontractor who will perform work or labor or render service to the Bidder in or about the construction of the Work, or a subcontractor licensed by the State of California who, under subcontract to the Bidder, specially fabricates and installs a portion of the Work according to detailed drawings contained in the plans and specifications made a part of the Contract Documents, in an amount in excess of one-half of one percent of the Bidder's total bid amount, and

(ii) the portion of the Work which will be done by each subcontractor. Each Bidder shall list only one subcontractor for each such portion of the Work. Any Bids submitted without including the required list of subcontractors shall be deemed to be non-responsive and may cause its rejection. The undersigned certifies that he and his subcontractors are properly licensed in accordance with the laws of the State of California.

If the bidder fails to specify a Subcontractor for any portion of the work to be performed under the contract in excess of one-half (1/2) of one percent (1%) of the bidder's total bid, bidder agrees that bidder is fully qualified to and will perform that portion of the work. The successful bidder shall not, without the consent of the Owner or compliance with Public Contract Code Sections 4100 - 4114, either:

1) Substitute any person as Subcontractor in place of the Subcontractor designated in the original bid;

2) Permit any subcontract to be voluntarily assigned or transferred or allow the work to be performed by anyone other than the original Subcontractor listed in the bid; or

3) Sublet or subcontract any portion of the work in excess of one-half (1/2) of one percent (1%) of the total bid as to which the bidder's original bid did not designate a Subcontractor.

The following list shows each of the subcontractors who will perform work under the contract, subject to the approval of the City, in excess of 1/2 of 1% of the total bid price or $10,000, whichever is greater (copy and attach additional sheets if necessary):

Subcontractor Name:	_____
Subcontractor License #:	_____
Trade / Description of Work:	_____
Business Location:	_____

BIDDER MUST COMPLETE THIS SHEET

Subcontractor Name: _____

Subcontractor License #: _____

Trade / Description of Work: _____

Business Location: _____

Subcontractor Name: _____

Subcontractor License #: _____

Trade / Description of Work: _____

Business Location: _____

Subcontractor Name: _____

Subcontractor License #: _____

Trade / Description of Work: _____

Business Location: _____

Subcontractor Name: _____

Subcontractor License #: _____

Trade / Description of Work: _____

Business Location: _____

Subcontractor Name: _____

Subcontractor License #: _____

Trade / Description of Work: _____

Business Location: _____

Subcontractor Name: _____

Subcontractor License #: _____

Trade / Description of Work: _____

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Trade / Description of Work: _____

Business Location: _____

Subcontractor Name: _____

Subcontractor License #: _____

Trade / Description of Work: _____

Business Location: _____

Subcontractor Name: _____

Subcontractor License #: _____

Trade / Description of Work: _____

Business Location: _____

Subcontractor Name: _____

Subcontractor License #: _____

Trade / Description of Work: _____

Business Location: _____

Add Extra Sheets if Needed

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DOCUMENTS TO BE SUBMITTED WITH BID

BIDDER'S CHECKLIST

- ☑ Make sure that all contractors and subcontractors listed on the proposal and list of subcontractors is currently registered with the California Department of Industrial Relations.

NOTE: All items set forth below must be completed at the time of submission of the bid to the City, with all attachments described below being attached hereto at such time. Additional sheets shall be attached as required. Failure by Bidder to complete all items and/or attach all attachments may, at the City's sole discretion, render said Bid as being non-responsive and may result in the rejection of the Bid by the City.

- ☑ INCLUDE WITH THIS BID the completed and signed BID FORM.
- ☑ INCLUDE WITH THIS BID a completed and signed BID BOND FORM.
- ☑ INCLUDE WITH THIS BID the completed "NON-COLLUSION AFFIDAVIT" included herein as required by California Public Contract Code Section 7106.
- ☑ INCLUDE WITH THIS BID the completed List of Subcontractors
- ☑ ATTACH TO THIS BID a signed statement from the bidder or preferably from the bidder's insurance carrier that all of the insurance requirements and exact endorsements stipulated in the Construction Contract have been reviewed and can be met. (see Statement of Review of Insurance Requirements form herein)

DOCUMENTS TO BE SUBMITTED IF APPARENT LOW BIDDER

- ☑ ; WITHIN 3 BUSINESS DAYS AFTER BID SUBMITTAL, provide the following:
  - Financial statement sufficiently comprehensive to permit an appraisal of Contractor's current financial condition.
  - Contractor experience, references and other information sufficiently comprehensive to permit an appraisal of Contractor's experience and qualifications. List the last 3 public works projects (i.e. state, county, city, school district, etc) in which the contract amount exceeded $50,000 and your company served as the prime contractor. Include the following information for each project:
    - Year contract awarded
    - Type of work
    - Contract completion time called for/actual completion time
    - Contract price
    - Project owner, including person to call for reference and phone number
    - Location of work
    - Number of stop notice claims filed
    - For each contract list any lawsuits filed relating to that contract in which you were a defendant or plaintiff
    - Amount of liquidated damages (if assessed)
  - The experience resumes of the person who will be the construction superintendent and proposed substitutes in the event of necessary changes in personnel; such resumes must reflect the projects worked on, the applicable supervisor's specialty and the time that each supervisor has worked on each project.

- A listing of all legal settlements, arbitration, mediation and lawsuits in which the company has been named within the last 10 years along with a description of the reason for the action and the final or pending outcome.
- List all construction contracts that you have failed to satisfactorily complete and the reasons for this.
- List any formal violations identified or action taken by the Contractor's State License Board against your company.
- Provide an affidavit certifying under penalty of perjury that the information provided is true and correct.

NON-COLLUSION AFFIDAVIT

TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

State of California
County of _____) S
)

_____, being first duly sworn, deposes and says that he

or she is _____

of _____, the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

_____
Date

_____
Signature

BIDDER MUST COMPLETE & SIGN THIS SHEET

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STATEMENT OF REVIEW OF INSURANCE REQUIREMENTS

Each bidder or preferably the bidder's insurance carrier shall submit a signed statement stating that all of the insurance endorsement and requirements stipulated in section 00 52 13 of the contract documents have been reviewed and can be met.

To: City of Sonoma

Statement of Review of Insurance Requirements for the **Valley of the Moon Nursery School ADA & Maintenance Improvement Project.**.

I have reviewed the insurance requirements including required endorsements contained in section 00 52 13 of the contract documents and will provide insurance certificates in substantially the form prescribed therein prior to work commencing on the project.

(Signed)	(Date)
(Name Printed)	Title
(Company)	

BIDDER MUST SUBMIT COMPLETED SHEET

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Agreement Form

This is an Agreement made on [**Add information here**], by and between the City of Sonoma, a municipal corporation of the general class (hereinafter referred to as the "CITY") and [**Add information here**] (hereinafter referred to as "CONTRACTOR"), in consideration of the mutual promises as set forth below, CITY and CONTRACTOR agree as follows:

1. Contract Scope.

1.1. Contract Documents.

CONTRACTOR agrees to perform all obligations described in the Contract Documents and to furnish all tools, equipment, labor, supplies, supervision and material necessary to perform and complete, in a good and workmanlike manner, construction of the **Valley of the Moon Nursery School ADA & Maintenance Improvement Project.** project, which shall hereinafter be referred to as "the Work," within the time set forth below and in accordance with the drawings and specifications for the Work that are part of this Agreement. The following documents specific to this project are hereby incorporated into and made part of this Agreement:

- Invitation to Bid
- Instructions to Bidders
- Bid Form
- Performance Bond
- Maintenance Bond
- Payment Bond
- Guarantee
- Bid Breakdown/Schedule of Values
- Non-Collusion Affidavit
- List of Subcontractors
- General Conditions of the Contract
- Specifications prepared by **STRATAap, dated April 4, 2016**.
- Drawings prepared by **STRATAap, dated April 4, 2016**.
- Addenda and all modifications incorporated in these documents before the execution of this agreement.

The abovementioned documents shall be referred to collectively as the "Contract Documents." All Contract Documents form the complete Agreement and are intended to integrate so that any work called for in one and not mentioned in the other is to be executed the same as if mentioned in all documents and set forth in the drawings.

1.2. Examination of Work Site.

By execution of this Agreement, CONTRACTOR warrants that it has carefully examined the site of the Work contemplated and the Contract Documents pertaining to the Work and has satisfied itself of all local and any special conditions affecting the Work and delivery of materials. Tests,

survey results, geotechnical reports, or other data or information furnished or referred to in the Contract Documents are furnished for the CONTRACTOR'S convenience. The CITY does not guarantee that such tests or preliminary investigations or other data and information are accurate and assumes no responsibility whatsoever as to their accuracy or interpretation. CONTRACTOR shall satisfy itself as to the accuracy or interpretation of all such tests or survey results or other information or data.

1.3. Compliance With Laws / Legal Requirements.

CONTRACTOR shall, at its expense, give all necessary notices and cause all Work done and materials and equipment furnished pursuant to the Contract Documents to strictly comply with all applicable local, state and federal laws, ordinances, rules, regulations, codes and orders (hereinafter referred to collectively as "Legal Requirements"). Further, CONTRACTOR covenants and warrants that it shall observe and comply strictly with all Legal Requirements in connection with the performance of the Work or otherwise. CONTRACTOR shall take and observe all necessary measures and precautions for the safety and protection of all property and persons in connection with the performance of the Work.

1.4. Contractor's License Classification.

In accordance with the provisions of California Public Contract Code Section 3300, the CITY has determined that a **Class B** California contractor's license is required at the time of contract award and the CONTRACTOR hereby certifies that he/she possesses said license.

2. Payment Terms.

2.1. Contract Sum.

CITY agrees to pay CONTRACTOR for performance of the Contract and completion of the Work in accordance with the Contract Documents the sum of [**Add information here**] DOLLARS ($[**Add information here**] (hereinafter, referred to as "Contract Sum." CONTRACTOR will be paid ninety percent (90%) of monthly estimates of work as described in Article 9 of the General Conditions. Ten percent (10%) shall be retained until final payment pursuant to the General Conditions.

Payment of undisputed Contract amounts is contingent upon the CONTRACTOR furnishing the CITY with a release of all claims against the public entity arising by virtue of the Contract related to those amounts. Disputed Contract claims in stated amounts may be specifically excluded by the CONTRACTOR from the operation of the release.

The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the CITY:

Alternate #	Description	Amount

Unit prices, if any, are provided in the Contractor's Proposal.

2.2. Substitution of Securities.

It is understood and agreed that in accordance with California Public Contract Code Section 22300, as set forth in Invitation to Bid, Section 00020 of the bid documents, CONTRACTOR will be allowed to either substitute securities for money withheld by CITY to ensure performance under this Agreement, or request the CITY to make payment of retentions earned directly into an escrow account at the expense of CONTRACTOR under the terms of an escrow agreement substantially similar to the form provided for in California Public Contract Code Section 22300(e). To the fullest extent permitted by California Public Contract Code Section 22300, CITY shall have the right to draw upon the securities or escrowed funds in the event of default by CONTRACTOR without any need by CITY to make any evidentiary showing of CONTRACTOR'S default other than the written notice required by Section 22300.

2.3. Progress Payments.

Based upon Applications for Payment submitted to the CITY by the Contractor and Approval of Payment issued by the CITY, the CITY shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents. The period covered by each Application for Payment shall be one calendar month ending on the last day of the month. Provided a complete application for Payment is received by the CITY not later than the fifth (5th) day of a month, the CITY shall make payment to the Contractor not later than the thirtieth (30th) day of the same month. If an Application for Payment is received by the CITY after the application date fixed above, payment shall be made by the CITY, if approved, not later than thirty (30) days after the CITY receives the complete Application for Payment. Each application for Payment shall be based upon the bid breakdown and schedule of values submitted by the Contractor in accordance with the Contract Documents. The bid breakdown and schedule of values shall allocate the entire Contract Sum among the various portions of the Work and be prepared in such form and supported by such data to substantiate its accuracy as the CITY may require. This schedule, unless objected to by the CITY, shall be used as a basis for reviewing the Contractor's

Applications for Payment. Applications for Payment shall indicate the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

2.4. Final Payment.

(a.) Final payment, constituting the entire unpaid balance of the Contract Sum, shall be paid by the CITY to the Contractor when the following conditions have been satisfied:

1. the Work has been fully completed,
2. the obligations of Contractor under the Contract Documents have been fully performed by the Contractor,
3. a final Application for Payment (together with the submittals required under the Contract Documents) has been submitted by the Contractor and a final Approval of Payment has been issued by the CITY in connection therewith,
4. the Work has been inspected and approved by the CITY and all applicable governmental authorities, and
5. no stop notices have been filed with the CITY with respect to the Work.
6. All payroll records required by Section 1776 of the Labor Code have been submitted to and reviewed by the CITY.

(b.) Contractor's acceptance of Final Payment shall constitute a waiver of claims against the City other than those previously made and submitted to the City in writing.

(c.) Final Payment shall not constitute a waiver by the CITY of any claims, whether known or unknown, that the CITY may have against the Contractor, Subcontractors or any other third parties.

3. Time of Commencement and Substantial Completion.

3.1. Time of Commencement..

The Work to be performed under this Contract shall be commenced by the date stated by the CITY in the Notice to Proceed. Time is of the essence in this Agreement.

3.2. Substantial Completion.

CONTRACTOR shall diligently prosecute the Work and achieve Substantial Completion of the entire Work **35** calendar days after the date stated in the Notice to Proceed (the "Contract Time"), subject to written authorized adjustments of the Contract Time as provided in the Contract Documents. There shall be no excuse for delay(s) in the timely completion of the Work except for: (a) CITY requested delays authorized in writing, or (b) delays for which CONTRACTOR would be entitled to an extension of time pursuant to Section 7.01(B) of the General Conditions.

3.3. Liquidated Damages.

It is imperative to complete the Work within the specified time. Should CONTRACTOR fail to complete this Contract within the Contract Time, as adjusted pursuant to Section 7.01(B) of the General Conditions, CONTRACTOR shall become liable to CITY for liquidated damages in the amount of **$200** for each calendar day said Work remains incomplete beyond the expiration of the Contract Time. CITY and CONTRACTOR agree that this agreed sum per day is reasonable. If it appears to CONTRACTOR that it will not complete the Work in the Contract Time, it shall make written application to CITY as set forth in Section 7.01.G of the General Conditions. CITY may then, in its sole discretion, grant or deny such extension. Any money due or to become due to CONTRACTOR may be retained to cover the liquidated damages and should such money not be sufficient to cover such damages, CITY shall have the right to recover the balance from CONTRACTOR or its sureties. The amount of liquidated damages provided in this Agreement is not intended to, nor does the amount include any damages incurred by CITY for reasons other than delay in the timely completion of the Work. CITY and CONTRACTOR agree that this liquidated damages clause meets the requirements of Government Code Section 53069.85 and any other applicable laws.

4. Labor Requirements.

4.1. Prevailing Wage.

The CONTRACTOR and subcontractors shall be registered and qualified to perform public work pursuant to Section 1725.5 of the California Labor Code. CONTRACTOR and its subcontractors shall pay not less than the general prevailing rate of per diem wages for work of a similar character in the locality in which the public work is performed, and not less than the general prevailing rate of per diem wages for holiday and overtime work fixed as provided in the California Labor Code, shall be paid to all workers employed on public works.

Pursuant to the California Labor Code the general prevailing rate of per diem wages has been determined by the Director of the California Department of Industrial Relations. The prevailing wages appearing in the General Prevailing Wage Rates, as established by the California Department of Industrial Relations, is hereby specifically referred to and by this reference is made a part of this contract. The prime contractor shall post job site notices as prescribed by regulation and a copy of the determination of the director of the prevailing rate of per diem wages and at the job site. Copies of the prevailing rate of per diem wages are on file at Sonoma City Hall.

It shall be the CONTRACTOR'S responsibility to contact the Department of Industrial Relations for General Prevailing Wage Rates on specific job classifications. The CONTRACTOR and each subcontractor shall furnish the records specified in Section 1776 directly to the CITY and the Labor

Commissioner, in the manner and format required by the Labor Commissioner. This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. CONTRACTOR shall forfeit to CITY, as a penalty, Fifty Dollars ($50.00) for each laborer, workman, or mechanic for each day such laborer, workman or mechanic is paid less than the prevailing rates as determined by the Director of the California Department of Industrial Relations for such work or craft in which such worker, is employed for any public work done under this Agreement by CONTRACTOR or by any subcontractor under CONTRACTOR.

4.2. Hours of Work.

Pursuant to California Labor Code Section 1810 and following, eight (8) hours of labor shall constitute a legal day's work upon all work done hereunder, and it is expressly stipulated no worker employed at any time by CONTRACTOR under this Agreement, upon the Work or upon any part of the Work contemplated by this Agreement, shall be required or permitted to work thereon more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week except as provided in Labor Code Section 1815. All of the provisions of that section are incorporated into this Agreement and it is further expressly stipulated that for each and every violation of such law, CONTRACTOR shall forfeit as a penalty to CITY, Twenty-Five Dollars ($25.00) for each workman employed in the execution of this Agreement, for each calendar day during which said worker is required to labor more than eight (8) hours in violation of such law. Contractor shall comply with the City's noise regulations for construction activities.

4.3. Payroll Records.

CONTRACTOR and each subcontractor shall keep, or cause to be kept, an accurate payroll record pursuant to Labor Code Section 1776, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by such CONTRACTOR and subcontractor(s) in connection with the Work herein. Copies of such payroll record certified in accordance with Labor Code Section 1776 shall be submitted weekly to CITY. CONTRACTOR shall have sole responsibility to comply in all respects with every requirement of Labor Code Section 1776 which is made a part hereof as though fully set forth.

4.4. Employment of Apprentices.

CONTRACTOR shall comply with each and every requirement set forth in Labor Code Sections 1777.5, 1777.6, and 1777.7 concerning the employment of registered apprentices in connection with the Work herein. Responsibility for compliance with these requirements lies solely with

CONTRACTOR.

4.5. Non-Discrimination.

CONTRACTOR shall comply with all applicable federal, state and local laws, rules and regulations in regard to non-discrimination in employment because of race, color, ancestry, national origins, religion, sex, marital status, age, medical condition or handicap.

5. Subcontracts.

It is understood and agreed that CONTRACTOR may sublet a portion of the Work only to the subcontractor(s) who are named in the CONTRACTOR'S proposal, and that CONTRACTOR will perform all other work unless specifically authorized by CITY as provided in Public Contract Code Section 4100 and following, with which provisions the parties hereto agree to comply.

6. Indemnification.

To the fullest extent allowed by law, Contractor shall defend, indemnify and hold harmless the City of Sonoma, its elected and appointed officials, contractors, and employees and agents, from all liability, penalties, costs, losses, damages, expenses, causes of action, claims or judgments, including attorney's fees and other defense costs, resulting from injury to or death sustained by any person (including Contractor's employees), or damage to property of any kind, or any other injury or damage whatsoever, which injury, death or damage arises out of or is in any way connected with the performance of the Work, regardless of the Contractor's fault or negligence, including any of the same resulting from City's alleged or actual negligent act or omission, or its agents, contractors or employees; except that said indemnity shall not be applicable to injury, death or damage to property arising from the sole or active negligence or willful misconduct of City, its officers, agents, or servants who are directly responsible to City. This indemnification shall extend to claims asserted after termination of this Contract for whatever reason.

This indemnification obligation is not limited in any way by any limitation on the amount or type of damages or compensation payable to or for CONTRACTOR or its agents under workers' compensation acts, disability benefit acts, or other employee benefit acts. CONTRACTOR shall be liable to CITY for any loss or damage to CITY property arising from or in connection with CONTRACTOR'S performance hereunder. CITY may deduct any costs and expenses incurred pursuant to this Section from payments due or which may become due CONTRACTOR.

CONTRACTOR shall comply with all federal, state and local regulations and laws pertaining to hazardous materials or hazardous substances as those terms are defined by any such law or regulation. CONTRACTOR shall

indemnify, hold harmless, release and defend CITY, its officers, employees and agents from and against any and all actions, claims, demands, damages, disabilities, losses, costs of clean-up, remediation and/or expenses, including attorney's fees and other defense costs or liabilities of any nature that may be asserted by any person or entity including CONTRACTOR arising out of or in any way connected with CONTRACTOR's failure to comply with said hazardous substance and/or hazardous materials laws and regulations.

7. Insurance Requirements for Contractors.

Contractor shall procure and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property, which may arise from or in connection with the performance of the work hereunder by the Contractor, his agents, representatives, employees or subcontractors.

7.1. Minimum Scope of Insurance

Coverage shall be at least as broad as:

(a.) Insurance Services Office Commercial General Liability coverage (occurrence form CG 00 01).

(b.) Insurance Services Office form number CA 0001 covering Automobile Liability, Code 1 (any auto).

(c.) Workers' Compensation insurance as required by the State of California and Employer's Liability Insurance.

(d.) Coverage shall not extend to any indemnity coverage for the active negligence of the additional insured in any case where an agreement to indemnify the additional insured would be invalid under Subsection (b) of Section 2782 of the Civil Code.

(e.) Course of Construction insurance covering for "all risks" of loss.

7.2. Minimum Limits of Insurance

Contractor shall maintain limits no less than:

(a.) General Liability: $2,000,000 per occurrence for bodily injury, personal injury and property damage including operations, products and completed operations. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project/location or the general aggregate limit shall be twice the required occurrence limit.

(b.) Automobile Liability: $1,000,000 per accident for bodily injury and property damage.

(c.) Employer's Liability: $1,000,000 per accident for bodily injury or disease.

(d.) Course of Construction: Completed value of the project with no co-insurance penalty provisions.

7.3. Deductibles and Self-Insured Retentions

Any deductibles or self-insured retentions must be declared to and approved by the City. At the option of the City, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the City, its officers, officials, employees and volunteers; or the Contractor shall provide a financial guarantee satisfactory to the City guaranteeing payment of losses and related investigations, claim administration and defense expenses.

7.4. Other Insurance Provisions

The general liability and automobile liability policies are to contain, or be endorsed to contain, the following provisions:

(a.) The City, its officers, officials, employees, and volunteers are to be covered as additional insureds with respect to liability arising out of automobiles owned, leased, hired or borrowed by or on behalf of the Contractor: and with respect to liability arising out of work or operations performed by or on behalf of the Contractor including materials, parts or equipment furnished in connection with your work or operations. General liability coverage shall be provided in the form of an endorsement to the Contractor's insurance or as a separate Owner's policy.

(b.) For any claims related to this project, the Contractor's insurance coverage shall be primary insurance as respects the City, its officers, officials, employees and volunteers. Any insurance or self-insurance maintained by the City, its officers, officials, employees, or volunteers shall be excess of the Contractor's insurance and shall not contribute with it.

(c.) Each insurance policy required by this clause shall be endorsed to state that coverage shall not be canceled by either party, except after ten (10) days' prior written notice given to the City.

(d.) Coverage shall not extend to any indemnity coverage for the active negligence of the additional insured in any case where an agreement to indemnify the additional insured would be invalid under Subdivision (b) of Section 2782 of the Civil Code.

Course of construction policies shall contain the following provisions:

(e.) The City shall be named as loss payee.

(f.) The insurer shall waive all rights of subrogation against the City.

7.5. Waiver of Subrogation

The Contractor's workers' compensation policy and general liability policy shall be endorsed with a waiver of subrogation. The insurance company, in its endorsement, agrees to waive all rights of subrogation against the

City, its officers, officials, employees and volunteers for losses paid under the terms of these policies which arise from the work performed by or on behalf of the named insured for the City.

7.6. Acceptability of Insurers

Insurance is to be placed with insurers either admitted to conduct insurance business in California and with a current A. M. Best rating of no less than A:VII or other (non-California admitted) insurance business with a current A. M. Best rating of no less than A+:X.

7.7. Verification of Coverage

Contractor shall furnish the City with original certificates and amendatory endorsements effecting coverage required by this clause. All certificates and endorsements are to be received and approved by the City before work commences. The City reserves the right to require complete, certified copies of all required insurance policies, including endorsements affecting the coverage required by these specifications at any time.

7.8. Subcontractors

Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverages for subcontractors shall be subject to all of the requirements stated herein.

7.9. Material Breach.

If CONTRACTOR, for any reason, fails to maintain any of the insurance coverage which is required pursuant to this Agreement, the same shall be deemed a material breach of this Agreement. CITY, at its sole option, may terminate this Agreement and obtain damages from CONTRACTOR resulting from said breach. Alternatively, CITY may purchase such required insurance coverage, and without further notice to CONTRACTOR, CITY may deduct from sums due to CONTRACTOR any premium costs advanced by CITY for such insurance. These remedies shall be in addition to any other remedies available to CITY.

8. Bonds.

CONTRACTOR shall furnish a labor and material payment bond and a performance bond, each in the full amount of the Contract Sum. Such bonds shall be in the forms set forth in the bid documents, and shall be issued by a corporate surety authorized to transact business in the State of California. The surety for such security shall be currently admitted to transact surety insurance by the California Department of Insurance and shall carry a Best's rating of no less than A-V. This Agreement shall not become effective until such bonds are supplied and approved by the CITY.

9. City's Right to Terminate Agreement

(a.) If Contractor:

1. Is insolvent or has made a general assignment for the benefit of creditors, or a receiver has been appointed on account of the insolvency of the Contractor.
2. Fails or refuses to diligently prosecute the Work or to perform the Work within the time specified in the current Construction Schedule;
3. Fails or refuses to make prompt payment to subcontractors or material suppliers for material or for labor;
4. Disregards laws, ordinances, or the instructions of the Owner;
5. Fails or refuses to correct nonconforming or rejected work or materials as required by the Contract Documents;
6. Fails to provide and keep in full force and effect all insurance required by the Contract Documents or fails to cause all Subcontractors to do so;
7. Fails to supply a sufficient number of properly skilled workers or proper materials, or
8. Materially violates any of the provisions of the Contract Documents;

then Owner may, without prejudice to any other right or remedy, give written notice to Contractor and surety, if any, that it intends to terminate this Agreement unless the problem cited is cured within seven (7) days of Contractor's receipt of the notice (or if such problem cannot be reasonably cured within such seven-day period, otherwise make satisfactory arrangements for a correction thereof, which arrangements are set forth in a written agreement signed by the Owner and Contractor). If Contractor fails to cure the problem (or otherwise make satisfactory arrangements for a correction thereof, which arrangements are set forth in a written agreement signed by the Owner and Contractor), Owner may then terminate this Agreement by providing written notice to Contractor. Upon providing such written notice of termination, Owner shall have the right to proceed in accordance with subsection (b) below and Contractor shall not have a right to further payment until the Work is completed.

(b.) In the event of any such termination, the Owner may:

1. take possession of the Site and of all materials,
2. provide written notice to Contractor of those subcontracts and supply agreements of which it intends to accept assignment pursuant to Section 9.2 hereof;
3. finish the Work by contract or by any other method it may deem advisable, for the account and at the expense of the Contractor; and
4. recover the actual costs and expenses incurred by Owner in finishing the Work (including management, supervision, and

design support, occasioned thereby) from the unpaid balance of the Contract Price or from Contractor or its surety.

5. If the City terminates the Contract for cause, the City may retain out of any funds due or to become due the Contractor the amount of the cost of completing the Work and any expense incidental to reletting the contract or performing the Work, and may also hold the Contractor and the Contractor's sureties responsible for such cost and expense, and for any damages resulting from the abandonment or failure, upon the bond. The Contractor shall not receive any further payment until the Work is complete.

(c.) If Contractor files a petition under the United States Bankruptcy Code, this Agreement shall terminate if Contractor or Contractor's trustee rejects this Agreement or, if there has been a default, Contractor is unable to give adequate assurance that Contractor will perform as required by this Agreement or otherwise is unable to comply with the requirements for assuming this Agreement under the applicable provisions of the United States Bankruptcy Code.

(d.) In the event the unpaid balance of the Contract Price exceeds the actual costs and expenses incurred by Owner in finishing the Work, such excess shall be paid to Contractor within thirty (30) days of Contractor's written demand. In the event such costs and expenses exceed the unpaid balance of the Contract Price, Contractor or Surety shall pay the difference to Owner within thirty (30) days of Owner's written demand. Upon the request of Contractor, Owner shall provide a detailed accounting of the cost incurred by Owner.

9.2. Convenience of the CITY.

(a.) Owner may terminate this contract at any time without cause, when the Owner considers it in the Owner's best interest to do so.

(b.) If Owner terminates this contract pursuant to this Contractor shall be paid an amount calculated as follows:

1. The cost of the work performed by Contractor.
2. Add a reasonable amount for profit and overhead.
3. Subtract the aggregate of previous payments made by Owner prior to termination.

(c.) Owner shall also pay Contractor fair compensation, either by purchase or rental at the election of Owner, for any equipment owned by Contractor which Owner elects to retain and which is not otherwise included in the cost of the work. To the extent that Owner elects to take legal assignment of subcontracts and purchase orders (including rental agreements), Contractor shall, as a condition of receiving the payments referred to in this section, execute and deliver all such papers and take all such steps, including the legal assignment of such subcontracts and other contractual rights of Contractor, as Owner may require for the purpose of fully vesting in Owner the rights and benefits of Contractor under such subcontracts or purchase orders.

(d.) Subcontracts, purchase orders, and rental agreements entered into by Contractor shall contain provisions permitting assignment to Owner, as described above, and providing for termination pursuant to the terms of this Agreement. If Owner accepts such assignment, Owner shall reimburse or indemnify Contractor with respect to all costs arising under the subcontract, purchase order, or rental agreement, except those which would not have been reimbursable as cost of the work if the contract had not been terminated. If Owner elects not to accept the assignment of any subcontract, purchase order, or rental agreement which would have constituted a cost of the work had this Agreement not been terminated, Contractor shall terminate such subcontract, purchase order, or rental agreement and Owner shall pay Contractor the costs necessarily incurred by the subcontractor to the date of such termination.

9.3. Savings Clause.

If Owner terminates Contractor for cause, and if it is later determined that the termination was wrongful, such default termination shall automatically be converted to and treated as a termination for convenience. In such event, Contractor shall be entitled to receive only the amounts payable under this section, and Contractor specifically waives any claim for any other amounts or damages, including, but not limited to, any claim for consequential damages or lost profits.

10. Representations and Warranties of CONTRACTOR.

The CONTRACTOR represents and warrants the following to the CITY (in addition to any other representations and warranties contained elsewhere in the Contract Documents) as an inducement to the CITY to execute this

Agreement:

(a.) that it will perform all Work called for hereunder in a good and workmanlike manner and in accordance with all Legal Requirements and the Contract Documents;

(b.) that it shall strictly comply with and satisfy all Legal Requirements applicable to the Work;

(c.) that it is financially solvent, able to pay its debts as they mature and possesses sufficient working capital to complete the Work and perform its obligations hereunder;

(d.) that it is a sophisticated CONTRACTOR who possesses a high level of experience and expertise in the business administration, construction, construction management and superintendence of projects of the size, complexity and nature of the Project to be constructed at the site, and it will perform the Work with care, skill and diligence of such a CONTRACTOR;

(e.) that it is able to furnish the plant, tools, materials, supplies, equipment and labor required to complete the Work and perform its obligations hereunder;

(f.) that it is authorized to do business in the State of California and properly licensed by all necessary governmental and public and quasi-public authorities having jurisdiction over it and over the Work;

(g.) that its execution of the Agreement and its performance thereunder is within its duly authorized powers;

(h.) that Contractor has reviewed existing site conditions, the bid documents including any plans, specifications and other documents for obvious omissions, errors, inconsistencies and inaccuracies and has notified the OWNER, in writing, of any and all said deficiencies encountered to date; and

(i.) that the foregoing warranties are in addition to, and not in lieu of, any and all other liability imposed upon the CONTRACTOR by law with respect to the CONTRACTOR'S duties, obligations and performance hereunder.

11. Notices.

All notices, bills, certified payroll, and payments shall be made in writing and may be given by personal delivery or by mail or by FAX (with original to follow by mail) and shall be addressed as follows:

CITY: Development Services Director
City of Sonoma
#1 The Plaza
Sonoma, CA 95476

Phone: 707-933-2211
Fax: 707-938-8775

CONTRACTOR: _____
_____
_____
_____

Phone:
Fax:
E-Mail:

and where so addressed, shall be deemed given upon deposit in the United States mail, postage prepaid or in the event of personal delivery, shall be deemed given upon personal delivery to the address listed above.

12. Miscellaneous.

12.1. Assignment

This Agreement shall not be assigned by CONTRACTOR without the prior written approval of CITY. CITY may freely assign this Agreement in its sole discretion.

12.2. Records and Audits

(a.) Contractor and its subcontractors shall establish and maintain records pertaining to this contract. Contractor's and subcontractors' accounting systems shall conform to generally accepted accounting principles and all records shall provide a breakdown of total costs charged under this contract, including properly executed payrolls, time records, invoices and vouchers.

(b.) Contractor shall permit City and its authorized representatives to inspect and examine Contractor's books, records, accounts, and any and all data relevant to this Contract at any reasonable time for the purpose of auditing and verifying statements, invoices, or bills submitted by Contractor pursuant to this contract and shall provide such assistance as may be reasonably required in the course of such inspection. City further reserves the right to examine and re-examine said books, records, accounts, and data during the three (3) year period following the termination of this Contract; and Contractor shall in no event dispose of, destroy, alter, or mutilate said books, records, accounts, and data in any manner whatever for three (3) years after the termination of this Contract.

(c.) Pursuant to California Government Code Section 10532, the parties to this Contract shall be subject to the examination and audit of representative of the Auditor General of the State of California for a period of three (3) years after final payment under the contract. The examination and audit shall be confined to those matters connected with the performance of this contract including, but not limited to, the cost of administering the contract

12.3. Waiver.

The waiver by CITY of any breach of any term or promise herein contained shall not be deemed to be a waiver of such term or promise, or any subsequent breach of the same or any other term or promise herein contained.

12.4. Construction.

To the fullest extent allowed by law, the provisions of this Agreement shall be construed and given effect in a manner that avoids any violation of statute, ordinance, regulation, or law. The parties covenant and agree that in the event that any provision of this Agreement is held by a court of competent jurisdiction to be invalid, void; or unenforceable, the remainder of the provisions hereof shall remain in full force and effect and shall in no way be affected, impaired, or invalidated thereby.

12.5. Merger.

The Contract Documents are intended both as the final expression of the agreement between the parties hereto with respect to the included terms and as a complete and exclusive statement of the terms of the Contract Documents pursuant to the Code of Civil Procedure Section 1856. No modification of the Contract Documents shall be effective unless and until such modification is evidenced by a writing signed by both parties.

12.6. Captions.

The captions in this Agreement are solely for convenience of reference. They are not a part of this Agreement and shall have no effect on its construction or interpretation.

12.7. No Third Party Beneficiaries.

There are no third party beneficiaries.

12.8. California Law.

This Agreement shall in all respects be interpreted, enforced and governed by and under the laws of the State of California.

12.9. Time of the Essence.

Time is and shall be of the essence of this Agreement and every provision hereof.

CONTRACTORS ARE REQUIRED BY LAW TO BE LICENSED AND REGULATED BY THE CONTRACTORS' STATE LICENSE BOARD WHICH HAS JURISDICTION TO INVESTIGATE COMPLAINTS AGAINST CONTRACTORS IF A COMPLAINT REGARDING A PATENT ACT OR OMISSION IS FILED WITHIN FOUR YEARS OF THE DATE OF THE ALLEGED VIOLATION. A COMPLAINT REGARDING A LATENT ACT OR OMISSION PERTAINING TO STRUCTURAL DEFECTS MUST BE FILED WITHIN 10 YEARS OF THE DATE OF THE ALLEGED VIOLATION. ANY QUESTIONS CONCERNING A CONTRACTOR MAY BE REFERRED TO THE REGISTRAR, CONTRACTORS' STATE LICENSE BOARD, P.O. BOX 26000, SACRAMENTO, CALIFORNIA 95826.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the date first set forth above.

ATTEST:

Gay Johann, City Clerk
City of Sonoma

CITY OF SONOMA

City Manager

CONTRACTOR

By:

Printed Name

Title

FOR CITY USE ONLY	
Project Name	Valley of the Moon Nursery School ADA & Maintenance Improvement Project
Project Account No.	610-00601-703-70703
Project Manager	W. Wirick

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DOCUMENTS TO BE SUBMITTED BY SUCCESSFUL BIDDER

Section	00 52 13	Agreement Form (Construction Contract)
	-	**Insurance - Proof of insurance meeting the requirements prescribed by Section 7 of the Agreement (Construction Contract) shall be submitted by the prime contractor and all subcontractors and approved by the Owner prior to performing any work.** **CONTRACTOR AND SUBCONTRACTORS MUST VERIFY WITH THEIR SURETY THAT INSURANCE REQUIREMENTS CAN BE MET PRIOR TO SUBMITTING BID.**
Section	00 61 13.13	Faithful Performance Bond
Section	00 61 13.16	Payment Bond
Section	00 61 19	Maintenance Bond
Section	00 62 40	Bid Breakdown/Schedule of Values
Section	00 65 33	Guaranty

The above-mentioned documents shall be completed and submitted by the successful bidder.

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Bond No. _____

(On Surety Letterhead)

FAITHFUL PERFORMANCE BOND

(100% of Contract Amount)

WHEREAS, the City of Sonoma, (hereinafter designated as "City"), State of California, and_____, (hereinafter designated as "Principal"), have entered into an Agreement whereby Principal agrees to furnish all labor, materials, equipment, tools, transportation, services, appliances, and appurtenances for the work and identified as the **Valley of the Moon Nursery School ADA & Maintenance Improvement Project.**, which said agreement and work are referred to and made a part hereof; and

WHEREAS, said Principal is required under the terms of said Agreement to furnish a bond for the faithful performance of said Agreement.

NOW, THEREFORE, we, the Principal, and _____ as surety, are held and firmly bound unto the City in the penal sum of _____ Dollars ($_____), lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally, firmly by these presents.

The condition of this obligation is such that if the above bounded principal, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and provisions in the said agreement and any alteration thereof made as therein provided, on his or their part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their true intent and meaning, and shall indemnify and save harmless City, its officers, agents and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

As a part of the obligation secured hereby and in addition to the face amount specified therefore, there shall be included costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by City in successfully enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

The surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Agreement or to the work to be performed thereunder or the specifications accompanying the same shall in anyway affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the agreement or to the work or to the specifications

IN WITNESS WHEREOF, this instrument has been duly executed by the Principal and surety above-named, on_____, 20____.

[NOTE: To be signed by Principal and Surety and acknowledgement and notarial seal attached.]

_____
PRINCIPAL

[Attach Notary Acknowledgement]

By: _____

Title: _____

_____
SURETY

By: _____

Title: _____

I certify under penalty of perjury that Surety is admitted by the Department of Insurance to transact business in the State of California and has a Best's rating of _____ (must be A-V or better).

_____
SURETY

By: _____

Title: _____

Mailing Address of Surety: _____

_____

Phone Number of Surety: _____

<u>NOTE:</u> Attach Notary and Power of Attorney and County Clerk's Certificate of Authority of Admitted Surety Pursuant to 995.648 of Code of Civil Procedures.

(On Surety Letterhead)

PAYMENT BOND
(LABOR AND MATERIALS)
(100% of Contract Amount)

KNOW ALL PERSONS BY THESE PRESENTS, that the City of Sonoma ("City") a municipal corporation located in the County of Sonoma, State of California has awarded a contract to and has entered into an agreement

with_____,
hereinafter designated as "Principal" whereby Principal agrees to complete the improvements more particularly described in all documents forming the complete contract entitled,

_____, which
said agreement is hereby referred to and made a part hereof; and

WHEREAS, said Principal is required to furnish a bond in connection and with said contract, provided that if said Principal, or any of his/her/its contractors, shall fail to pay for any materials, provisions, provender or other supplies or teams used in, upon, for or about the performance of the work contracted to be done, or for any work or labor done thereon of any kind, the Surety of this bond will pay the same to the extent hereinafter set forth.

NOW, THEREFORE, we the Principal and
_____,
as surety, are held and firmly bound unto the City of Sonoma in the penal sum of
$_____ lawful money of the United States, being not less than one hundred (100%) percent of the estimated contract cost of the work, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if said Principal, his/her/its heirs, executors, administrators, successors or assigns, or its subcontractors, shall fail to pay any of the persons named in Section 3181 of the Civil Code, or to pay for any materials, provisions, provender, or other supplies or teams used in, upon, for or about the performance of the work contracted to be done, or for any work or labor thereon of any kind or for amounts due under the Unemployment Insurance Code with respect to such work or labor, then said Surety will pay the same in or to an amount not exceeding the amount hereinabove set forth, and also will pay in case suit is brought upon this bond a reasonable attorney's fee in such suit, which fee shall be fixed by the Court.

AS FURTHER TERMS OF THIS BOND, IT IS UNDERSTOOD AS FOLLOWS:

1. This bond and all its provisions shall inure to the benefit of and all persons named in Section 3181 of the Civil Code so as to give a right of action to such persons or their assigns in any suit brought upon this bond.

2. This bond is given to comply with the provisions of Chapter 7, Part 4, Division 3, of the Civil Code. The liability of the Principal and Surety hereunder is governed by the provisions of said Chapter, all acts amendatory thereof, and all other statues referred to therein.

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

IN WITNESS WHEREOF, the above bound parties have executed this instrument under their seals this _____ day of_____, 20____, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

[NOTE: To be signed by Principal and Surety and acknowledgement and notarial seal attached.]

_____
PRINCIPAL

[Attach Notary Acknowledgement]

By: _____

Title: _____

_____
SURETY

By: _____

Title: _____

I certify under penalty of perjury that Surety is admitted by the Department of Insurance to transact business in the State of California and has a Best's rating of _____ (must be A-V or better).

_____
SURETY

By: _____

Title: _____

Mailing Address of Surety: _____

_____

Phone Number of Surety: _____

(On Surety Letterhead)

Maintenance Bond (1-Year)
(10%)

KNOW ALL PERSONS BY THESE PRESENTS, that the City of Sonoma hereinafter designated as "City"), a municipal corporation located in the County of

Sonoma, State of California, and _____ (hereinafter designated as "Principal") entered into a contract on the _____ day of _____, 20_____, whereby Principal agreed to complete the improvements more particularly described in all documents forming the complete contract entitled **Valley of the Moon Nursery School ADA & Maintenance Improvement Project.**, which said contract is hereby referred to and made a part hereof; and

WHEREAS, said Principal is required under the terms of said contract to furnish a bond conditioned to guarantee the maintenance of those improvements ("said improvements") for a period of _____ year(s) from the date of acceptance of said improvements by the City, against all defects in workmanship and materials which may become apparent during said period.

NOW, THEREFORE, we, the Principal and _____, as Surety, are held and firmly bound unto the City in the penal sum of_____, Dollars ($_____) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, successors, executors and administrators, jointly and severally, firmly by these presents. This penal sum shall not be less than ten percent of the contract amount, meaning the entire amount paid by the City to the Contractor (Principal), including but not limited to the contract bid amount awarded and any change orders.

THE CONDITION of this obligation is such that if the said Principal shall faithfully carry out and perform said guaranty in accordance with the terms of said specifications and shall, on due notice, promptly repair and make good at its own expense all defects of material or workmanship in the said work which may develop or become apparent during the 1-year period beginning from the effective date of City acceptance of said improvements by the City Council, or shall pay over, make good and reimburse to the City all loss and damage which the City may sustain by reason of failure or defect of said Principal so to do, and shall indemnify and save harmless the City, its officers, agents and employees, as therein stipulated, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

AS PART OF THE OBLIGATION secured hereby and in addition to the face amount specified therefore, there shall be included costs and reasonable expenses and fees, including reasonable attorney's fees, incurred by City in successfully enforcing such obligation, all to be taxed as costs and included in any judgment rendered.

THE SURETY HEREBY STIPULATES AND AGREES that no change, extension of time, alteration or addition to the terms of the contract or the work to be performed thereunder of the specifications accompanying the same shall in any way effect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

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

[NOTE: To be signed by Principal and Surety and acknowledgement and notarial seal attached.]

_____
PRINCIPAL

[Attach Notary Acknowledgement]

By: _____

Title: _____

_____
SURETY

By: _____

Title: _____

I certify under penalty of perjury that Surety is admitted by the Department of Insurance to transact business in the State of California and has a Best's rating of _____ (must be A-V or better).

_____
SURETY

By: _____

Title: _____

Mailing Address of Surety: _____

_____

Phone Number of Surety: _____

Bid Breakdown

Your bid, excluding Alternates, must be broken down on the following bid breakdown form or on another form (Schedule of Values) approved by the City. The bid breakdown shall be submitted by the apparent low bidder to the City within 7 days of submittal of bid to show specific elements of the bid. Leave non-applicable items blank and add items as necessary.

	Description of Work	Bid
1.	General Conditions	$
2.	Fees & Permits	$
3.	Equipment Rental	$
4.	Temporary Job Site Facilities & Fencing	$
5.	Stripping	$
6.	Survey	$
7.	Misc. Site Work	$
8.		$
9.	Daily Clean-up	$
10.	Final Cleaning	$
11.	Selective Demolition	$
12.	Trenching & Excavation	$
13.	Grading	$
14.	Backfill	$
15.	Paving	$
16.	Building Sub Drainage Systems	$
17.	Landscaping and irrigation	$
18.	Curb, Gutter & Public Sidewalks (off-site improvements)	$
19.	Concrete Flat Work	$
20.		$
21.	Reinforcing Steel	$
22.	Misc. Metals & Fabrications	$

23.	Carpentry (labor)	$
24.	Lumber (materials)	$
25.	Built-in Cabinets and Casework	$
26.	Insulation	$
27.	Flashing & Sheet Metal	$
28.	Caulking & Sealants	$
29.	Doors & Frames	$
30.	Finish Hardware	$
31.	Gypsum Board	$
32.	Pre-finished Paneling and Wainscotings (FRP)	$
33.	Ceramic Tile	$
34.	Vinyl flooring	$
35.	Carpet	$
36.	Painting	$
37.	Vinyl Wall covering	$
38.	Toilet Partitions & Accessories	$
39.	Signage	$
40.	Fire Extinguishers and Enclosures	$
41.		$
42.	Misc. Specialty Items	$
43.	HVAC	$
44.	Rough Plumbing	$
45.	Finish Plumbing Equipment & Fixtures	$
46.	Rough Electrical	$
47.	Finish Electrical Equipment & Fixtures	$
48.	Smoke Detection and Alarm Systems	$
49.	Insurance	$

50.	Bonds	$
51.	Contractor's Overhead & Profit	$
52.		$
53.		$
54.		$
55.		$
56.		$
	Total Bid - Should Equal 100% of Contract Amount (Excluding Alternatives)	$

General Contractor

Date

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GUARANTEE

(This guarantee shall be executed by the successful bidder prior to or at the time the contract for construction is executed.)

To the City of Sonoma for construction of

Valley of the Moon Nursery School ADA & Maintenance Improvement Project.

The undersigned Contractor hereby grants to City for a period (Guarantee Period) of one (1) year following the date of Final Completion of the Work, its unconditional guarantee of the quality and adequacy of all of the Work to be installed under the Contract including, without limitation, all labor, materials and equipment provided by Contractor and its Subcontractors of all tiers in connection with the Work. For the purposes of this Guarantee, Final Completion of the Work shall mean the date of Owner acceptance of the Work of the Contract.

Neither final payment nor use or occupancy of the Work performed by the Contractor shall constitute an acceptance of work not done in accordance with this Agreement or relieve Contractor of liability in respect to any express warranties or responsibilities for faulty materials or workmanship. Contractor shall remedy any defects in the Work and pay for any damage resulting therefrom which shall appear within the Guaranty Period.

Should any of the materials or equipment prove defective or should the Work as a whole prove defective, due to faulty workmanship, material furnished or methods or installation, or should the Work or any part thereof fail to operate properly as originally intended and in accordance with the Contract Documents due to any of the above causes within the Guaranty Period, the Contractor shall:

(1) upon demand by the City, replace any such material and to immediately repair said Work completely without cost to the City so that said Work will function successfully as originally contemplated.

(2) reimburse the City, upon demand, for its expenses incurred in restoring said Work to the condition contemplated in the Contract Documents, including the cost of any such equipment or materials replaced and the cost of removing and replacing any other work necessary to make such replacement or repairs, or

Inspection of the work shall not relieve the Contractor of any of its obligations under the Contract Documents. Even though equipment, materials, or work required to be provided under the Contract Documents have been inspected, accepted, and estimated for payment, the Contractor shall, at its own expense, replace or repair any such equipment, material, or work found to be defective or otherwise not to comply with the requirements of the Contract Documents up to the end of the guaranty period.

The Contractor shall make such repairs within a reasonable period of time after the receipt of demand from the City; provided, however that in no event shall such period exceed twenty-five (25) days.

Should the Contractor fail to make necessary repairs within twenty-five (25) days, the City shall have the unqualified option to make any needed replacement or repairs itself or to have such replacements or repairs done by another Contractor.

_____ _____

Contractor Date

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1. GENERAL CONDITIONS

1.01. DEFINITIONS

Act of God

A cataclysmic phenomenon of nature, such as an earthquake, flood or cyclone. Rain, wind, high water, or other natural phenomenon which might reasonably have been anticipated from historical records of the general locality of the Work shall not be construed as acts of God.

Agreement

Agreement means the agreement executed by the City and the Contractor (Construction Contract or Contract for Construction).

Contract Documents

See Section 1.1 of the Agreement for a definition of Contract Documents.

Contract Sum

Contract Sum means the sum of the construction contract as set forth in Section 2 of the Agreement.

Contract Time

Contract Time shall be the number of days to complete the Work as set forth in Section 3 of the Agreement.

Contractor

The person or organization mentioned as such in the Agreement and contracting to perform the work to be done under the Contract Documents, or the legal representatives of such person or persons.

City

City means the City of Sonoma, a political subdivision of the State of California and its authorized representatives.

Day

Calendar day.

Development Services Director

Development Services Director for the City of Sonoma or his authorized representative.

Direction

Action of the City by which the Contractor is ordered to perform or refrain from performing work under the Contract Documents.

Drawings

Drawings shall mean all drawings, sketches, diagrams and similar documents given to the Contractor pursuant to the Contract Documents.

Final Completion

The date the Project is accepted by the City Council.

Float Time

Any time in excess of the time necessary to complete work items listed in the construction schedule.

Legal Requirements

See Section 1.3 of the Agreement for definition.

Owner

Owner means the City of Sonoma, a political subdivision of the State of California and its authorized

representatives.

Specifications

Specifications shall mean all technical specifications given to Contractor and any and all addenda thereto.

Subcontractor

The term "Subcontractor" as used herein, includes individuals or firms that furnish labor, equipment or materials worked to a special design according to the Contract Documents of the Work, but does not include one who merely furnishes material not so worked. Subcontractor includes all tiers of subcontractors and material suppliers.

Substantial Completion

The date as certified by the City when the construction of the project is sufficiently completed, in accordance with the Contract Documents, as to be utilized for the purposes which it was intended. Notwithstanding anything stated to the contrary in the Contract Documents, the Work shall not be deemed Substantially Complete unless and until it complies with all Legal Requirements and all requirements of the Contract Documents.

Work

The term "Work" means all contractual obligations required by the Contract Documents, whether completed or partially completed, and includes all other tools, equipment, labor and material necessary to perform and complete the project in a good and workmanlike manner within the time set forth and in accordance with the Contract Documents. The Work may constitute the whole or a part of the project.

1.02. CORRELATION AND INTENT OF DOCUMENTS

A. The Contract shall be executed by the City and the Contractor in the number of copies required by the City Clerk.

B. Anything shown on the Drawings and not mentioned in the Specifications or mentioned in the Specifications and not shown on the Drawings shall have the same effect as if shown or mentioned respectively in both. Technical specifications take priority over general drawings. Any work shown on one Drawing shall be construed to be shown in all Drawings and Contractor will coordinate the Work and the Drawings. If any portion of the Contract Documents shall be in conflict with any other portion, the higher quality or higher quantity shall be used. The various documents comprising the Contract Documents shall govern in the following order of precedence: The Agreement; any Special Conditions, the General Conditions; the Specifications; the Drawings; any modifications and Addenda; the bid documents; and any Administrative Provisions. As between schedules and information given on Drawings, the Schedules shall govern. As between figures given on Drawings and the scaled measurements, the figures shall govern. As between large-scale Drawings and small-scale Drawings, the large scale shall govern.

C. When compliance with two or more requirements is indicated in any of the Contract Documents and when those requirements conflict in quantity or quality, Contractor shall comply with the most stringent requirement unless specifically indicated otherwise in the Contract Documents. In addition, when provisions in two or more of the Contract Documents are complimentary, the more detailed provision shall control over the more general provision. It is the intent of the Contract Documents, and they shall be so construed, to require a high quality of work and shall include all items necessary to produce the results intended by the Contract Documents and desired by the City.

D. Materials or work described in words which so applied have a well-known technical or trade meaning shall be held to refer to such recognized standards.

E. The misspelling, misplacement, addition or omission of a word, character or notation shall not be held to change the obvious intent of the Contract Documents.

1.03. OWNERSHIP OF DRAWINGS AND MODELS

All Drawings, Specifications, and copies thereof, are the City's property. They are not to be used on other work, and are to be returned upon request, upon completion of the Work. All models are the property of the City.

2. ADMINISTRATION OF THE CONTRACT

2.01. DEVELOPMENT SERVICES DIRECTOR'S STATUS

A. The Development Services Director shall have general oversight of the project. He is the agent of the City, as provided in the Contract Documents.

B. Notwithstanding the foregoing, however, the City shall not be responsible for, and will not have control or charge of, construction means, methods, techniques, sequences or procedures in connection with the Work, and shall not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. City shall not be responsible for or have control or charge over the acts or omissions of Contractor, Subcontractors or any of their agents or employees or any other persons performing any of the Work.

2.02. DEVELOPMENT SERVICES DIRECTOR'S DECISIONS

A. The Development Services Director shall, within a reasonable time, make decisions on all claims of the City or Contractor and all other matters relating to the execution and progress of the Work or the interpretation of the Contract Documents which shall be final in the first instance. The Development Services Director's decisions, in matters relating to artistic effect, shall be final, if within the terms of the Contract Documents.

B. The Development Services Director shall decide all questions as may arise as to the quality or acceptability of items and materials furnished and work performed; as to the acceptable fulfillment of the Contract Documents on the part of the Contractor; and as to the interpretation of the Specifications.

C. The Development Services Director may delegate any or all of the decisions described in this section to the Architect or other representative of the City.

2.03. INSPECTION OF THE WORK

The Work will be inspected periodically by an authorized representative of the City of Sonoma Building Department and other local government agencies having jurisdiction over the Work. These inspections are in addition to and separate from inspections performed by the owner's representative or project design professionals and are conducted for the purpose of verifying compliance with local, state and federal construction codes enforced by the Building Department. The project design professional and the Development Services Director or his/her authorized representative, acting as the owner's authorized representative, will perform periodic inspections of the work to verify conformance with the intent of the construction documents.. It shall be the duty of the Contractor to arrange for and notify the inspectors and testing agency a minimum of twenty-four (24) hours in advance that Work is ready for inspection or testing.

2.04. REFERENCE STANDARDS

A. For products specified by Association or Trade Standards, Contractor shall comply with the requirement of the standard except when more rigid requirements are specified or are required by applicable codes.

B. The date of the applicable standard is the standard in effect as of the bid date, or date of the Contract when there are no bids, except when a specific date is specified.

2.05. DRAWINGS AND SPECIFICATIONS FOR THE WORK

The Contractor shall keep one (1) copy of all Contract Documents on the Work in good order, available to the Architect, Development Services Director, the City's Construction Manager, inspectors and other City representatives.

3. CITY

3.01. DIRECTIONS BY CITY

Whenever in the Specifications the words "as directed" or "as required", or "as permitted," or words of like effect are used, it is understood that the direction, requirement, or permission of the "City" or "Owner" is indicated; similarly the word "approved," "acceptable," "satisfactory," or words of like import, shall mean "approved by," "acceptable to," or "satisfactory to, the "City" or "Owner".

3.02. COPIES FURNISHED BY CITY

Unless otherwise provided in the Contract Documents, the City will furnish to the Contractor, free of charge, all copies of Drawings and Specifications reasonably necessary for the execution of the Work.

3.03. CITY'S RIGHT TO STOP THE WORK

A. The Development Services Director shall have the authority to direct the order in which the Work shall be done and shall exercise such control over the Work from time to time as may be in his opinion required, and may stop the Work whenever such stoppage may be necessary to ensure the proper execution of the Contract Documents.

B. If the Contractor fails to correct defective Work as required by Section 11 herein or fails to carry out the Work in accordance with the Contract Documents, the Development Services Director may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated.

C. The Contractor shall bear all costs of such Work stoppage unless it is determined that no fault existed in the Contractor's Work. Any Work stoppage for the correction of defective Work or removal and replacement of unacceptable materials and equipment will not be considered as the basis for any time extension.

D. If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within forty-eight (48) hours after receipt of written notice from the Development Services Director to commence and continue correction of such default or neglect with diligence and promptness, the Development Services Director may, by written notice and without prejudice to any other remedy the City may have, make good such deficiencies. Should the Contractor fail to commence and complete correction of such default or neglect and should the City do so, the City shall deduct from the payments then or thereafter due to the Contractor the direct and indirect costs of correcting such deficiencies, as well as any damages sustained by the City, made necessary or resulting from such default, neglect or failure of the Contractor.

3.04. PERMITS AND FEES

Contractor shall obtain and pay for all necessary permits and licenses, etc., for the performance of the Work. The Contractor shall comply with all of the requirements set forth by the permits issued. The City shall reimburse Contractor for any building permit, water connection fee, encroachment permit, building inspection fee, plan check or other City fee normally paid to the City of Sonoma.

3.05. NON-LIABILITY OF CITY

In the event that the City shall perform any portion of or the whole of the Work pursuant to the provisions of these General Conditions, the City shall not be liable nor account to Contractor in any way for the time within which, or the manner in which, such work is performed by it, or for the amount

of money expended by it in performing such work, or for any changes it may make in such work, or for the money expended by it in satisfying claims and/or suits and/or other obligations in connection with said Work.

4. CONTRACTOR

4.01. FURNISH, PROVIDE, SUPPLIED OR INSTALL

Whenever elements are shown on the plans or when in the Specifications the words "furnish," "provide," "supplied," "install," "set," or words of like intent are used, it shall be understood that the materials or work so shown or specified are to be "furnished," "provided," "supplied," and "installed," or "set" by the Contractor unless otherwise noted.

4.02. SUPERVISION AND CONSTRUCTION PROCEDURES

A. Contractor shall supervise and direct the performance of the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents.

B. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

C. Contractor represents to City that it has carefully studied and analyzed the Contract Documents. By proceeding with the Work, Contractor indicates that: (1) all details, construction procedures and materials shown or specified in the Contract Documents are consistent with sound, standard and acceptable practices within the construction industry and (2) Contractor is willing and able to construct the Work in accordance with all requirements of the Contract Documents within the Contract Time and for the Contract Sum. If Contractor performs any portion of the Work knowing it to be in error or in violation of any Legal Requirement or, Contractor should have known from its review of the Contract Documents, that the design of the project or the Contract Documents contained errors, omissions, inconsistencies, or discrepancies, Contractor shall assume full responsibility therefore and shall bear all costs attributable thereto.

4.03. MATERIALS, APPLIANCES, EMPLOYEES

A. Unless otherwise stipulated, Contractor shall provide and pay for all materials, labor, water, electricity, phone, sanitation, communications, tools, equipment, transportation and other facilities necessary for the execution and completion of the Work.

B. Materials shall be new, standard and the best quality of their respective kinds for the purpose intended and satisfactory to the Development Services Director. Only one brand, kind and make of materials shall be used for each purpose throughout the Work unless otherwise specified by the Contract Documents.

C. Articles or materials may be substituted for those specified by trade name only with the consent of the City.

D. Materials called for, for which Standard Specifications have been published by the American Society for Testing Materials, shall comply with the Specifications, current edition, of the American Society for Testing Materials, with all revisions.

E. The methods used and workmanship provided by the Contractor shall be such as will produce satisfactory results, and shall be in accordance with the best practices and subject to the approval of the City.

F. Contractor shall, at all times, enforce strict discipline and good order among its employees, and shall not employ on the Work any unfit person or anyone not skilled in the work assigned to him.

G. Should the City, for just cause, deem anyone employed on the Work incompetent or unfit for duties, and so informs the Contractor, the Contractor shall dismiss such person, and such person shall not again, without permission, be employed upon the Work.

H. Work and materials, as delivered to the premises to form part of the Work, shall not be removed from the premises without the City's consent, except that the Contractor shall remove surplus materials and materials that are deemed defective by the City.

4.04. CONTRACTOR'S WORKMANSHIP GUARANTEE

A. Contractor hereby grants to City for a period of one (1) year following the date of Final Completion of the Work, its unconditional warranty of the quality and adequacy of all of the Work including, without limitation, all labor, materials and equipment provided by Contractor and its Subcontractors of all tiers in connection with the Work.

B. Any individual guarantee requirement that is more than one year and stipulated in a different specification section will take precedence over Section 4.04.A above (see also Instructions to Bidders, and Guaranty to be filed upon award).

C. Should any of the materials or equipment prove defective or should the Work as a whole prove defective, due to faulty workmanship, material furnished or methods or installation, or should the Work or any part thereof fail to operate properly as originally intended and in accordance with the Contract Documents due to any of the above causes within one (1) year after date of Final Completion, the Contractor shall: (1) reimburse the City, upon demand, for its expenses incurred in restoring said Work to the condition contemplated in the Contract Documents, including the cost of any such equipment or materials replaced and the cost of removing and replacing any other work necessary to make such replacement or repairs, or (2) upon demand by the City, replace any such material and immediately repair said Work completely without cost to the City so that said Work will function successfully as originally contemplated. The City shall have the unqualified option to make any needed replacement or repairs itself or to have such replacements or repairs done by the Contractor. In the event the City elects to have said work performed by the Contractor, the Contractor shall confirm within five (5) days of the notice that it will make such repairs within a reasonable period of time which in no event shall such period exceed twenty-five (25) days.

4.05. REQUEST FOR CLARIFICATION OF DETAIL DRAWINGS AND INSTRUCTIONS

Upon Contractor's reasonable request, to be decided by Development Services Director, the City shall furnish additional instructions, by means of drawings or otherwise, necessary for the proper execution of the Work. The Work shall be executed in conformity therewith, and the Contractor shall do no work without proper drawings and instructions.

4.06. CODES

A. Unless noted otherwise, the latest national and state codes, ordinances and regulations adopted by the City of Sonoma as of the date the City receives bids for the Work shall apply to this project.

B. Any re-drafting, recalculation or re-engineering required for original Contract Documents to achieve code compliance shall be supplied by City at its expense.

4.07. CONTRACTOR'S SUPERINTENDENT

A. During the course of the Work, Contractor shall keep at the jobsite a competent superintendent and any necessary assistants, all of which shall be satisfactory to the City. The superintendent shall not be changed except with the written consent of the City, unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in Contractor's employ. The superintendent shall represent the Contractor in Contractor's absence and all directions given to the superintendent shall be as binding as if given to the Contractor.

B. City reserves the right to remove from the Work any of Contractor's personnel, including the superintendent, if in City's sole discretion it determines that the person is incompetent or non-cooperative in the execution of the Work or the Work is not being performed in a timely fashion in accordance with the Contract Documents.

C. The superintendent shall attend weekly project meetings with the Architect and City's project manager.

4.08. PROJECT RECORD DOCUMENTS

A. A complete set of Drawings and Specifications, marked "as-built" shall be kept on the job site for the sole purpose of recording all deviations from the original Contract Documents and noting accurately the actual location of underground and concealed lines, stub-outs, etc. This information shall be kept current by the Contractor and its Subcontractors. Progress billings may be withheld until "as-built" drawings are completely up-to-date as of the billing period. Upon completion of the project, a "clean" set of reproducible "as-built" drawings shall be prepared and delivered to the City's Development Services Director.

4.09. Not Used

4.10. USE OF PREMISES

A. The City's tenant will be occupying portions of the premises during the course of the project. Tenant will provide reasonable access for all of Contractor's work to be performed. Contractor shall coordinate the use and occupancy of specific areas of the premises with the tenant so as to provide a safe environment for Contractor, the tenant and the general public.

B. The Contractor shall confine its apparatus, the storage of materials and operations of its workers to limits indicated by any Legal Requirements and/or directions of the Development Services Director, and shall not unreasonably encumber the premises with its material. Apparatus and equipment used by the Contractor during construction shall be placed in such locations as not to interfere with or delay the completion of the Work or occupancy by the City's tenant. Where any portion of the Work is to be finished before other portions of the Work, the portions to be finished shall not be used for the storage of materials, and no construction apparatus shall be installed in such parts of the Work. Hoist and construction appliances shall be installed on the interior of the building to which the Work pertains only when approved by the Development Services Director, and are to be installed on the exterior wherever possible.

C. The Contractor shall enforce the City's instructions regarding signs, advertisements, time of work, days of work, noise restrictions, dust control, fire and smoking. The Contractor agrees that it will conduct all its operations so as not to interfere in any way with the continued operation of the City's facilities.

D. The Contractor shall not allow any signs or advertising of any kind on the job site, except as specifically approved in advance by the Development Services Director.

E. Contractor shall exercise all special controls necessary to assure public safety and control dust, water, storm drainage, erosion, liter and pollution as required by the project conditions and/or Legal Requirements. When directed by the Development Services Director to take necessary steps to control dust, erosion, storm runoff, liter, etc., the Contractor shall affect immediate measures. The cost of special controls required shall be included in the Contract Sum and shall not create additional costs to City.

F. Contractor shall not begin any demolition operations until all temporary dust curtains\controls are in place and approved by the Development Services Director. The dust controls shall be maintained until after all sanding, painting or other operations that produce dust or fumes are completed. Interior dust protection will extend from floor to ceiling.

G. Contractor shall assume all the liability for claims related to dust or wind-blown materials attributable to its work. Special measures shall be taken to keep dust and debris from automobiles parked in the vicinity of the construction site.

H. Arrange with Development Services Director any parking permits needed for work force and deliveries.

I. Contractor is responsible for erecting and maintaining barriers and posting proper caution signs for the general public. Contractor shall provide security for the work area, equipment, disposal dumpsite and any area where work or materials are contained. This security is to be adequate to ensure no unauthorized persons enter the work area.

J. When traffic control is required for the project, Contractor shall be responsible for providing the necessary safety measures, personnel, barricades and coordinating and obtaining the permission of the responsible local authorities. The cost of this control is included in the Contract Sum.

K. Extreme care shall be taken by the trucks removing demolition material, that they do not deposit any of the material on any public street. The trucks running in and out of the project area during the site clearing shall be extremely careful not to cause inconvenience or annoyance to the neighbors.

4.11. ROYALTIES AND PATENTS

The Contract Sum shall include any patent fees or royalties on any patented article or process that may be furnished or used in connection with the Contract Documents. Contractor shall indemnify and hold City harmless from any legal action that may be brought for infringement of patents.

4.12. PROPERTY

City shall bear no responsibility whatsoever for any property (including tools) owned, leased, borrowed or otherwise used by Contractor, its subcontractors, or any employees while at the job site or elsewhere. Further, Contractor shall be fully responsible for all material to be used in construction until such time as that material becomes an integral part of the structure(s) and is accepted by City. Any loss or damage to such material shall be fully borne by Contractor, who shall have no recourse whatsoever to City. Contractor is expected to be fully responsible for protection of such unattached property without regard to whatever protective measures are provided by City.

4.13. JOB SITE

A. Contractor shall remove if necessary, save and reinstall in a neat and workmanlike manner any features that are not part of the Work such as fencing, signs, interior partitions, landscaping, equipment, fixtures, decorations or other similar items.

B. Except where repair work is noted in the Contract Documents, Contractor will not be responsible to repair existing conditions not specified as part of the Work, as long as the Development Services Director is made aware of existing conditions prior to Contractor beginning work.

4.14. OCCUPANCY REQUIREMENTS

A. City's tenant will be occupying portions of the premises during the course of constriction. The City's tenant will vacate specific areas of the premises required for the Work to occur during each phase of construction. Contractor shall cooperate with City and City's tenant to minimize conflict and shall not interfere with City's or tenant's operations.

B. Partial occupancy or complete occupancy shall not be deemed acceptance or completion of the Work in whole or in part.

4.15. SANITARY CONVENIENCES

The Contractor shall, at the commencement of the Work, provide and maintain in sanitary condition during the course thereof and until the time of completion, such sanitary conveniences, including toilet facilities, handwashing facilities and drinking water, as may be specified or as may be required by Legal Requirements. Contractor shall also maintain at least one toilet and one handwashing sink for use by tenant. Upon completion of the Work, such sanitary conveniences shall be disinfected and all evidence of it removed.

4.16. KEYS AND ACCESS TO SITE

The Development Services Director shall provide keys, codes or assistance for entry to the Work as necessary. Contractor shall turn over all keys and codes provided by City to locked doors, panels, gates, etc., tagged and organized to the Development Services Director. Contractor shall pay the full cost of re-keying or other costs to City made necessary as a result of Contractor's failure to deliver all keys or other access information.

4.17. GUARANTEES, CERTIFICATES, WARRANTIES, BROCHURES, OPERATING AND MAINTENANCE MANUALS

A. Unless otherwise specified, upon completion of the project and before final inspection or payment, Contractor shall furnish two (2) sets, bound in 8-1/2 x 11 inch, three (3) ring binders and one copy in electronic PDF format, the following documentation:

1. Guarantees, Certificates and Warranties: All guarantees and certificates shall be properly and fully executed on a form approved by the City and shall be submitted to the Development Services Director prior to final acceptance of the project. In case of work performed by Subcontractors and/or material or equipment furnished by manufacturers where special guarantees are required, warranties addressed to and in favor of the City shall be secured from said Subcontractors and/or manufactures and delivered to the Development Services Director prior to final acceptance of the Work. The deliveries of said guarantees shall not relieve the Contractor from any obligation assumed under any other provision of the Contract Documents.

2. Brochures and Operating Manuals: Complete, edited and approved brochures and operating manuals of all equipment on the project. Contractor shall provide operating and maintenance procedures on all equipment to City's representative prior to initial startup of the facilities.

3. Maintenance Manuals: Contractor shall provide maintenance manuals, parts lists and other manufacturer's literature pertaining to preventive maintenance, including any special tools, handles or other devices necessary for operation or maintenance work.

B. All of the requirements of this section, the other requirements of these General Conditions and the delivery of As-Built Record Drawings to the Development Services Director, will be a prerequisite to the processing of the final payment. In the event that compliance is not possible within the time period specified herein, the Development Services Director will recommend withholding payment as assurance for compliance.

C. Prior to Final Payment, the Contractor and applicable Sub-contractors shall conduct an on-site review of the maintenance and operations of all equipment, appliances, fixtures and installed electrical, communications, signal, mechanical, plumbing, irrigation and other similar systems with the City's maintenance personnel to fully familiarize them with maintenance and operational procedures.

4.18. ANTITRUST and UNFAIR BUSINESS PRACTICES CLAIMS

In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or Subcontractor offers and agrees to assign to the City all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the City tenders final payment to the Contractor, without further acknowledgment by the parties.

4.19. NOTICE ON DISCOVERY OF HAZARDOUS WASTE OR OTHER UNUSUAL CONDITIONS

Where the Contract Documents require the Contractor to dig trenches or other excavations that extend deeper than four feet below the surface the following provisions shall apply.

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

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

2. Subsurface or latent physical conditions at the site differing from those indicated.

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

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

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

4.20. RELOCATION OF UTILITIES

A. Pursuant to Government Code Section 4215, the City shall compensate the Contractor for the costs of locating, repairing damage not due to the failure of the Contractor to exercise reasonable care, and removing or relocating such utility facilities not indicated in the Contract Documents with reasonable accuracy, and for equipment on the project necessarily idled during such Work.

B. The Contractor shall not be assessed liquidated damages for delay in completion of the Work, when such delay was caused by the failure of the City or the owner of the utility to provide for removal or relocation of such utility facilities.

C. Nothing contained herein shall be deemed to require the City to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the project site can be inferred from the presence of other visible facilities, such as buildings, meter and junction boxes, on or adjacent to the project site.

5. SUBCONTRACTORS

5.01. RELATIONS OF CONTRACTOR AND SUBCONTRACTOR

A. The Contractor agrees to bind every Subcontractor and every Subcontractor agrees to be bound by the terms of the Contract Documents.

B. Contractor shall require each Subcontractor:

1. To be bound to the Contractor by the terms of the Contract Documents and to assume toward Contractor all the obligations and responsibilities that the Contractor, by these Contract Documents, assumes toward the City.

2. To submit to the Contractor applications for payment in such reasonable time as to enable the Contractor to apply for payment under Section 8 herein.

3. To make all claims for extras, for extensions of time and for damages for delays or otherwise, to the Contract in the manner provided in the General Conditions for like claims by the Contractor upon the City, except that the time for making claims for extra cost to the Contractor is seven (7) days from the date of discovery of the claim.

C. The Contractor agrees:

1. To be bound to the Subcontractors by all the obligations that the City assumes to the Contractor under the Contract Documents, and by all the provisions thereof affording remedies and redress to the Contractor from the City.

2. To pay the Subcontractors to such extent as may be provided by the Contract Documents or the subcontract, or by the provisions of California Civil Code Section 3262.5 which the parties agree is applicable to the Agreement, if any of these provides for earlier or larger payments than the above.

3. To pay the Subcontractors on demand for Subcontractors' work or materials as far as executed and fixed in place, less the retained percentage, at the time the certificate should issue, even though the City fails to issue it for any cause not the fault of the Subcontractors.

4. To pay the Subcontractors a just share of any fire insurance money received by the Contractor.

5. To make no demand for any liquidated damages or penalty for delay in any sum in excess of such amount as may be specifically named in the subcontract.

6. That no claim for services rendered or materials furnished by the Contractor to the Subcontractors shall be valid unless written notice thereof is given by the Contractor to the Subcontractors during the first ten (10) days of the calendar month following that in which the claim originated.

D. The Contractor and Subcontractors agree that nothing in this Section 5 shall create any obligation on the part of Owner to pay or to see to payment of any sums to any Subcontractor.

5.02. ACTS AND OMISSIONS

A. The Contractor agrees that it is as fully responsible to the City for the acts and omissions of its Subcontractors and of persons directly or indirectly employed by them, as Contractor is for the acts and omissions of persons directly employed by Contractor.

B. Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor and the City.

6. LIENS

6.01. ASSIGNMENTS; TITLE TO WORK

A. Contractor warrants to City that: (1) title to all Work, materials and equipment will pass to City upon the receipt of payment by the Contractor, free and clear of all liens, claims, security interests or encumbrances (collectively referred to as liens), and (2) the Contractor shall acquire no Work, materials or equipment whether directly or through a Subcontractor, subject to an agreement under which a lien is retained by the seller or otherwise imposed by the Contractor, any Subcontractor or any other person or entity.

6.02. CLAIMS, LIENS

A. The Contractor shall at all times promptly pay for all labor done or materials furnished to Contractor in the performance of the Contract Documents, in default whereof the City may retain from payments, as they become due the Contractor, such sums of money as the Development Services Director shall deem sufficient to pay such amount in default and before payments are made, the Contractor shall furnish to the Development Services Director satisfactory evidence, in accordance with California Civil Code Section 3262, that no claim then exists against said Contractor for labor done or materials furnished under the Contract Documents.

B. The Contractor shall be subject to the laws of the State of California regarding claims or liens for labor, materials and appliances furnished for the Work, and shall promptly make payments in full of the claims of all mechanics, materialmen, subcontractors and all persons of every class performing labor upon or bestowing skill or other necessary services on, or furnishing materials to be used or consumed in, or furnishing appliances, trucks, teams, water or power contributing to the construction of the Work required by these Contract Documents, and Contractor shall protect and indemnify the City against all such claims.

C. Neither the final payment nor any part of the retained percentage shall become due until the Contractor, if required, shall deliver to the City a complete release of all claims or liens arising out of the Contract Documents, or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as Contractor has knowledge or information, the releases and receipts include all the labor and material for which a claim or lien could be filed, but the Contractor may, if any Subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the City, to indemnify the City against any claim or lien. If any claim or lien remains unsatisfied after all payments are made, the Contractor shall refund to the City all monies that the latter may be compelled to pay in discharging such claim or lien, including all costs and reasonable attorney fees.

7. TIME

7.01. TIME REQUIREMENTS, DELAYS AND EXTENSION OF TIME

A. Prosecution of Work. The Contractor shall begin and prosecute the Work in accordance with the terms of the Contract Documents, and the rate of work shall be such as to ensure completion within the time specified in Section 3 of the Agreement. Contractor is to start all scheduled activities at the earliest possible date.

B. Extensions of Time for Delays. The time during which the Contractor is delayed in the performance of the Work on the critical path by the acts or omissions of the City (or its agents or employees), Acts of God, unusually severe and abnormal climatic conditions, fires, floods, epidemics, quarantine restrictions, strikes, riots, civil commotions or freight embargoes, or by causes which could not reasonably be anticipated and which are totally beyond Contractor's control and which despite Contractor's best efforts to prevent or remedy the situation, results in unavoidable delay to completion of the Work, shall be added to the time for completion of the Work (i.e., the Contract Time) stated in the Agreement. However, no claim by the Contractor for an extension of time for delays(s) will be considered unless it is made in compliance with the requirements of the Contract Documents. In all events, Contractor promises and agrees to immediately take all steps reasonably possible to lessen the adverse impact of any delay(s). Contractor acknowledges that the cumulative effect of change orders may have an impact on the progress or the cost of the Work. Notwithstanding such possible impact, Contractor agrees that no additional time extension or any money damages for delay will be sought by Contractor for such "cumulative" effect.

C. No Money Damages for Delay. Should the Contractor be delayed in the commencement, prosecution or completion of the Work by an Act of God, unusually severe and abnormal climatic conditions, fires, floods, epidemics, quarantine restrictions, strikes, riots, civil commotions or freight embargoes, or other conditions beyond the Contractor's control and which the Contractor could not have reasonably foreseen and provided against, then the Contractor shall be entitled to an extension of time only, such extension to be for a period equivalent to the time lost by reason of any and all of the aforesaid causes. It is understood and agreed that the Contractor's sole and exclusive remedy in any such events shall be an extension of the Contract Time, but only as determined in accordance with the provisions of the Contract Documents. The City shall not be obligated or liable to the Contractor for any money damages and the Contractor expressly waives any claims for any indirect or direct damages, costs, or expenses of any nature which Contractor, its subcontractors or sub-subcontractors or any other person may incur as a result of the types of delays described herein.

D. No Money Damages for Delays Caused by City. If the performance of all or any part of the Work is, for a reasonable or unreasonable period of time, suspended, delayed, or interrupted by any act or omission of the City or Architect, or by failure of the City or the Architect to act within the time specified in the Contract Documents (or if no time is specified, within a reasonable time), a time adjustment shall be made for an increase in the actual time required for performance of the Work by the Contractor due solely to such suspensions, delay or interruption and the Contract Documents modified in writing accordingly. However, the City shall not be obligated or liable to the Contractor for any money damages and the Contractor expressly waives any claims for any indirect or direct damages, subcontractors, or sub-subcontractors or any other person may incur as a result of any such delays, interferences, changes in sequence, or the like arising out of or in connection with any act or omission of the City (or its agents, employees, consultants, or independent contractors) it being understood and agreed that Contractor's sole and exclusive remedy in any such event shall be an extension of the Contract Time, but only as determined in accordance with the provisions of the Contract Documents. Contractor expressly acknowledges that delay(s) for the causes described above are within the contemplation of the parties for purposes of California Public Contract Code Section 7102.

E. The Contract Time shall be adjusted only for changes pursuant to Section 11 of these General Conditions, and excusable delays pursuant to Subparagraph 7.01(B) herein. In the event the Contractor requires an extension of the Contract Time, the Contractor shall furnish such justification and supporting evidence as the City may deem necessary for a determination of whether or not the Contractor is entitled to an extension of time under the provisions of the Contract Documents. The burden of proof to substantiate a claim for an extension of the Contract Time shall rest with the Contractor, including evidence that the cause was beyond Contractor's control. The City shall base its decision on such justification and supporting evidence and any other available relevant evidence and shall advise the Contractor in writing thereof. If the City finds that the Contractor is entitled to any extension of the Contract Time, the City's determination of the total number of days extension shall be based upon the currently approved progress schedule and on all data relevant to the extension. Such data will be incorporated into the schedule in the form of a revision thereto, accomplished in a timely manner. The Contractor acknowledges and agrees that actual delays (due to said changes, suspension of Work or excusable delays) in activities which, according to the schedule, do not affect the Contract Time, do not have any effect upon the Contract Time and therefore will not be the basis for a change therein. The Contractor acknowledges and agrees that time extensions will be granted only to the extent that excusable delays exceed the available float in the Contractor's schedule.

F. The term "abnormal climatic conditions" in this section means abnormal inclement weather. The Contract Time will not be extended due to normal inclement weather. The time for performance of the Work includes an allowance for 5 calendar days that may not be available for construction out-of-doors. Unless the Contractor can substantiate to the satisfaction of the City that there was greater than normal inclement weather considering the full term of the Contract Time using a ten year average of accumulated record mean values from climatologically data compiled by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration for the locale of the project, and that such alleged greater than normal inclement weather actually delayed the Work or portions thereof which had an effect upon the Contract Time, the Contractor shall not be entitled to an extension of time. If the total accumulated number of calendar days lost due to inclement weather, from the start of Work until Substantial Completion, exceeds the total accumulated number to be expected for the same period from the aforesaid table, time for completion will be extended by the number of calendar days equal to the number of additional calendar days lost.

G. Waiver of Time by Contractor. The Contractor shall not be entitled to and hereby expressly waives any extension of time resulting from any condition or cause unless said claim for extension of time is made in writing to City as soon as inability to progress work on the critical path becomes apparent to Contractor or within three (3) days of the first instance of delay. In no event shall said claim be submitted less than thirty days prior to expiration of the time for Substantial Completion. Circumstances and activities leading to such claim shall be indicated or referenced in a daily field inspection report for the day(s) affected; otherwise, all such claims are hereby deemed waived by the Contractor. In every such written claim, the Contractor shall provide the following information:

1. Nature of the delay;
2. Description of events causing or contributing to delay;
3. Date (or anticipated date) or commencement of delay;
4. Activities on the progress schedule affected by the delay, and/or new activities created by the delay and their relationship with existing activities;
5. Identification of person(s) or organization(s) or event(s) responsible for the delay;
6. Anticipated extent of the delay; and
7. Recommended action to avoid or minimize the delay.

H. Written Interpretations. If no schedule or agreement is made stating the dates upon which written interpretations shall be furnished, then no claim for delay shall be allowed on account of failure to furnish such interpretations until twenty (20) days after demand is made for them, and not then unless Contractor demonstrates that it required the interpretation in a reasonable time and how the response affected work on the critical path.

7.02. CONSTRUCTION SCHEDULE PROCEDURES

Contractor shall maintain the following construction schedule procedures:

A. Submit, for the Development Services Director's review, an initial construction schedule in the format of a horizontal bar chart, with a separate line for each major section of the Work or operation, identifying the first workday of each week, critical path elements and milestones for the project. The initial construction schedule shall be in duplicate and shall be submitted within five (5) days after the Notice to Proceed is issued. Upon the Development Services Director's request, Contractor shall revise and resubmit within three (3) days of such request. The Contractor shall show the detailed sequence of construction by activity, identifying Work of separate stages and other logically grouped activities, indicating durations of each activity, including, but not limited to, earliest start date, duration of activity, and float time at the end of an activity.

B. On a weekly basis, submit 2-week look ahead schedules to indicate immediate scheduling of work.

C. Submit schedules with each Application for Payment, identifying changes since previous submittal.

D. Indicate estimated percentage of completion for each item of the Work at each submittal, and a weighted overall percentage completion for the project.

E. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by the City and under allowance. Indicate dates required for Development Services Director reviews and inspections and all final review dates including close-out activities.

7.03. RESPONSIBILITY FOR COMPLETION

A. The Contractor shall furnish such manpower, materials, facilities and equipment and shall work such hours, including, without limitation, night shifts, overtime operations and Sundays and holidays, as may be necessary to ensure the progress and completion of the Work in accordance with the reviewed and currently updated progress schedule. If the Work falls behind the currently updated and reviewed progress schedule and it becomes apparent from the current schedule that the Work will not be completed within the Contract Time, the Contractor agrees that it will, as necessary, take some or all of the following actions at no additional cost to the City, as required to bring the Work back up to the status shown on the current schedule:

1. Increase manpower in quantities and crafts necessary;

2. To the extent allowed by applicable Legal Requirements, increase the number of working hours per shift, shifts per working day, working days per week, the amount of equipment, or any combination of the foregoing; and/or

3. Reschedule activities to achieve maximum practical concurrence.

B. The Development Services Director may require the Contractor to submit a recovery schedule demonstrating Contractor's program and proposed plan to make up the lag in scheduled progress and to ensure completion of the Work within the Contract Time. If the Development Services Director finds the proposed plan unacceptable, the Development Services Director may require the Contractor to submit a new plan. If the actions taken by the Contractor or the second plan proposed are not satisfactory, the Development Services Director may require the Contractor to take any of the actions set forth in this section without additional cost to the City, to make up the lag in scheduled progress.

C. Failure of the Contractor to comply with the requirements of this section may be considered grounds for a determination by the City that the Contractor is failing to prosecute the Work with sufficient diligence to ensure its completion within the Contract Time.

8. PAYMENTS AND COMPLETION

8.01. APPLICATION FOR PAYMENTS

A. The Contractor shall submit to the Development Services Director an application for each payment and, if required, receipts or other vouchers showing Contractor's payments for materials and labor, including payments to Subcontractors as required in these General Conditions. The payment application shall be based on Contractor's Bid Breakdown Form, as modified at City's request. Until completion of the Work, the City shall pay ninety percent (90%) of the amount due to Contractor on account of progress payments.

B. The City may, in its sole and unfettered discretion, make any portion of any periodic payment to which the Contractor is entitled by way of a joint payment to the Contractor and to a Subcontractor, materialman or supplier.

C. If payments are made on valuation of the Work done, such application shall be submitted at least thirty (30) days before each payment falls due, and the Contractor shall, before the first application, submit to the Development Services Director a schedule of values of the various parts of the work, including quantities, aggregating the Contract Sum, divided so as to facilitate payments to Subcontractors in accordance with these General Conditions, made out in such form as the City and the Contractor may agree upon and, if required, supported by such evidence as to its correctness as the City may direct. This schedule, when approved by the Development Services Director, shall be used as a basis for Certificates of Payment, unless it is found to be in error. In applying for payments, the Contractor shall submit a statement based upon this schedule and, if required, itemized in such form and supported by such evidence as the Development Services Director may direct, showing Contractor's right to the payment claimed.

D. If payments are made on account of materials delivered and suitably stored at the site, but not incorporated in the Work, if required by the City, they shall be conditioned upon submission by the Contractor of bills of sale or such other documentation or procedures as will establish the City's title to such material or otherwise adequately protect the City's interest.

E. Contractor shall submit the following items as part of each payment application. City's obligation to pay Contractor is conditioned upon receipt of all items listed below:

1. Copies of payroll certified in accordance with Labor Code Section 1776 shall be submitted weekly to the Development Services Director and the submittal of such certified payroll will be a requirement for payment.

2. [List other items required, such as schedule updates, etc.]

8.02. CERTIFICATES OF PAYMENT

A. Payments to the Contractor will be made by the City only upon the certification by the Development Services Director.

B. If the Contractor has made application as above, the Development Services Director shall issue a Certificate for Payment for such amount as the Development Services Director recommends to be properly due after deducting any percentage agreed upon in the Contract Documents to be retained by the City.

C. No Certificate issued, nor payment made to the Contractor, nor partial or entire use or occupation of the work by the City, shall be an acceptance of any work or material not in accordance with the Contract Documents.

D. Pursuant to Section 20104.50 of the California Public Contract Code, should the City fail to pay any progress payment within thirty (30) days after receipt of an undisputed and properly submitted payment request, Contractor shall receive, upon demand, in addition to the sum set forth in the Certificate of Payment, interest thereon at the legal rate set forth in subdivision (a) of Section 685.010 of the California Code of Civil Procedure.

8.03. PAYMENTS WITHHELD

A. The City may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any Certificate of Payment to such an extent as may be necessary to protect the City from loss on account of:

1. Defective work not remedied;

2. Claims filed or reasonable evidence indicating probable filing of claims;

3. Failure of the Contractor to make payments properly to Subcontractors, or for material or labor;

4. Reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

5. Damage to the City or another contractor;

6. Reasonable evidence that the Work cannot be completed within the Contract Time and that the unpaid balance of the Contract Sum would not be adequate to cover liquidated damages for the anticipated delay; or

7. Failure of the Contractor, in the Development Services Director's reasonable judgment, to carry out the Work in accordance with the Contract Documents.

8. Failure of the Contractor to provide certified payroll records when requested by the City.

8.04. SUBSTANTIAL COMPLETION

A. Within thirty (30) days after completion of the Work, the Contractor shall submit to the Development Services Director a final application for payment.

B. When the Development Services Director agrees that the Work is substantially complete, the Development Services Director will issue a Notice of Substantial Completion. Prior to issuance of a Notice of Substantial Completion, however, the Contractor shall prepare for submission to the Architect and/or the Development Services Director a list of items to be completed or corrected (the Punchlist) for the Development Services Director's approval. The failure to include any item on the Punchlist shall not alter the responsibility on Contractor to complete the Work in accordance with the Contract Documents. The Architect and/or the Development Services Director shall inspect the Work to confirm the accuracy of the Punchlist and add items as deemed necessary. Such inspection, however, shall not relieve the Contractor of its responsibility to correct any Work that is defective. Upon issuance of a Certificate of Substantial Completion, the City may make and file a Notice of Completion pursuant to applicable Legal Requirements respecting the filing of notices of completion.

C. The Development Services Director shall not be bound by the preceding monthly certificates, and none of the same shall be taken as having been a final determination of the amount to be paid or as to the acceptance of any Work or release to the Contractor for any liability. If the monies retained on the final payment shall not be sufficient to cover claims and demands which may be made against the City by reason of any act or omission of the Contractor, the deficiency shall be made good by the Contractor and/or the surety or sureties on Contractor's bonds upon demand therefore.

8.05. FINAL PAYMENT

A. At the end of the thirty-five (35) days from the recording of the Notice of Completion as herein provided for, the Contractor shall furnish satisfactory evidence to the Architect and/or the Development Services Director that: (1) all items on the Punchlist have been satisfactorily completed, and (2) all claims for labor and materials have been paid. If no claim shall have been presented to the City by any person, and no liens or claims for labor and materials have been paid and no liens or claims shall have been filed or made against work of the property whereon it was done, or against the City, the City shall pay, subject to the requirements of the preceding sentence, to the Contractor all sums retained under the terms hereof, less deductions for injury, loss or damage which may have been sustained by reason of any act or omissions of the Contractor. If laborers, material dealers or any other persons make claims against the City by reason of any act or omission of the Contractor for any portion of said retained monies during said thirty-five (35) day period, the City, out of any monies retained by it, may at its option pay said claims and charge the amount of any such payment to the Contractor and such payment, if so made, shall be deemed and treated as though made directly to the Contractor.

B. Prior to Final Payment, the Contractor and applicable Sub-contractors shall conduct an on-site review of the maintenance and operations of all equipment, appliances, fixtures and installed electrical, communications, signal, mechanical, plumbing, irrigation and other similar systems with the City's maintenance personnel to fully familiarize them with maintenance and operational procedures.

9. PROTECTION OF PERSONS AND PROPERTY

9.01. SAFETY REGULATIONS

Contractor shall be solely and completely responsible for the conditions of the job site, including safety of all persons and property during performance of the Work. This requirement will apply continuously and shall not be limited to normal working hours. The duty of the Development Services Director to conduct construction reviews of the Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures in, on, or near the construction site.

9.02. MATERIAL SAFETY DATA SHEETS

Contractor shall provide three (3) copies of Material Safety Data Sheets (MSDS) for any paints, solvents, thinners, varnish, lacquer, glues and adhesives, mastics, or other material needed for the project as required by individual sections of this specification or as specified in the Hazard Communication Program.

9.03. PROTECTION OF WORK AND PROPERTY AND LOSS OR DAMAGE

A. The Contractor shall continuously maintain adequate protection of the Work from damage and shall protect the City's property from injury or loss arising in connection with the Contract Documents. Contractor shall adequately protect adjacent property, as provided by law and the Contract Documents. All losses or damages arising out of the nature of the work, or from action of the elements, or from floods or overflows, or from groundwater, or from any unusual obstruction or difficulty, or any other natural or existing circumstance, either known or unforeseen, which may be encountered in this prosecution of work, shall be sustained and borne by the Contractor at his own cost and expense.

B. The Contractor shall take all necessary precautions for the safety of employees and others on the Work, and shall comply with all Legal Requirements to prevent accidents or injury to persons on, about or adjacent to the premises where the Work is being performed. The Contractor shall erect at the project site and maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for the protection of workers and the public, and shall post danger signs warning against the hazards created by such features of construction as protruding nails, hod hoists, well holes, elevator hatchways, scaffolding, window openings, stairways and falling materials. The Contractor shall designate a responsible member of its organization on the Work whose duty shall be the prevention of accidents. The name and position of the person so designated shall be reported to the Development Services Director.

C. The City shall not be answerable or accountable, in any manner, for any loss or damage that shall, or may, happen to the Work or any part or parts thereof respectively, or for any materials or other things used and employed in finishing and completing said Work, or for injury to any person or persons whether worker or the public, or for damage to adjoining property from any cause which might have been, or which is claimed might have been, prevented by the Contractor, or any worker, or anyone employed by, or acting for the Contractor, all of which injuries and damages to person and property the Contractor having control over such Work must properly guard against and must make good all damages from whatever cause, being strictly responsible for same.

D. The Contractor shall properly cover and protect its materials and the Work from damage by the elements or from any cause, and shall provide all materials for this purpose, and shall maintain such covering and protection, removing the protection when no longer necessary, and turning the Work over at completion free from damage.

E. Where there are other contractors employed on the Work, each shall be responsible to the other for all damages to the Work, to persons or property, and for loss caused by neglect, by failure to finish work at the proper time, and preventing each portion of the Work from being finished by the several contractors by the dates within the time fixed for completion, or from any other causes; and any contractor suffering damage shall call the attention of the Development Services Director to the same.

F. In an emergency affecting the safety of life, public health or safety, of a structure or of adjoining property, the Contractor shall take all necessary and proper steps to prevent such threatened loss or injury. If practical, the Contractor shall communicate with the City, and shall be guided by the City's directions and advice, but if the character of the emergency be such as to require action with such short limits of time or under circumstances rendering that impractical, then the Contractor shall act independently and upon its own responsibility, subject to the direction and control of the City, as soon as it may become practical to obtain the same.

10. CHANGES IN THE WORK

10.01. CHANGES IN THE WORK

A. The City, without invalidating the Contract Documents, may order extra work or make changes by altering, adding or deducting from the Work, the Contract Sum being adjusted accordingly. All such work shall be executed under the conditions of the original Agreement, except that any claim for extension of time caused thereby shall be adjusted by City, at the time of ordering such change.

B. In giving instructions, the Architect and/or the Development Services Director shall have the authority to make minor changes in the Work, not involving extra cost and not inconsistent with the purposes of the project, but otherwise (except in an emergency endangering life and property) no extra work or change shall be made unless in pursuance of a written order from the City, stating that the City has authorized the extra work or change, and no claim for an addition to the Contract Sum or Contract Time shall be valid unless so ordered.

C. The value of such extra work or change shall be determined in one or more of the following ways:

1. By estimate and acceptance in a lump sum.
2. By unit prices named in the Contract Documents or subsequently agreed upon.
3. By actual cost and percentage, as allowed in Section 10.10 below.

D. If one of the above methods is agreed upon, the Contractor shall proceed with the Work, provided the Contractor receive an order as above. In such case and also under Section 10.01(C)(3), the Contractor shall keep and present in such form as required by the City, a correct account of the cost of labor and materials, together with vouchers and other documents evidencing such costs as City may reasonably request. In any case, the Development Services Director shall recommend the amount including reasonable allowance for overhead and profit as allowed in Section 10.10. Payments on account of changes may be made on the Development Services Director's certificate. If the Development Services Director and Contractor are unable to agree on the amount of any cost or credit to City resulting from a change in the Work, the Contractor shall promptly proceed with, and diligently prosecute, such change in the Work provided it receives a Construction Change Directive pursuant to Section 10.04 below, and the cost or credit to the City resulting therefrom shall be determined on the basis of the reasonable expenditures and savings of the Contractor attributable to any such change. The Contractor shall keep and present to the City an itemized accounting together with appropriate supporting documentation for use in determining the cost or credit to the City.

10.02. CHANGE ORDER PROCEDURES

A. The Architect or the Development Services Director may issue a Request for Cost Proposal which includes a detailed description of the change with supplementary or revised Drawings and Specifications, the projected time for executing the change, and the period of time during which the requested price will be considered valid.

B. Contractor may request a change by submittal of a request to the Architect or the Development Services Director describing the proposed change with a statement of the reason for the change and the effect on the Contract Sum and Contract Time, with full documentation, and a statement of the effect on work of any separate contractors.

C. The Contractor will prepare and distribute Change Orders for review and signatures of parties required to sign.

10.03. DOCUMENTATION OF CHANGE IN CONTRACT SUM AND CONTRACT TIME

A. Contractor shall maintain detailed records of the Work done on a time and material basis. Contractor shall provide full information required for evaluation of proposed changes, and to substantiate costs of changes in the Work.

B. Contractor shall document each quotation for a change in the Contract Sum or Contract Time with sufficient data to allow evaluation of the quotation.

C. Contractor shall, on request, provide additional data to support computations for:

1. Quantities of products, labor and equipment.
2. Taxes, insurance and bonds.
3. Overhead and profit.
4. Justification for any change in the Contract Time.
5. Credit for deletions from the Contract Documents.

D. Contractor shall support each claim for additional costs, and for work done on a time and material basis, with additional information including:

1. Origin and date of claim.
2. Dates and times work was performed and by whom.
3. Time records and wage rates paid.
4. Invoices and receipts for products, equipment and subcontracts.

10.04. WORK CHANGE DIRECTIVE

A. The City may issue a written Construction Change Directive instructing Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

B. The Construction Change Directive will describe changes in the Work, and will designate a method of determining any change in the Contract Sum or Contract Time.

C. Contractor will promptly execute the change in Work.

10.05. LUMP SUM CHANGE ORDER

A lump sum Change Order will be based on a proposal request and Contractor's fixed price quotation or Contractor's request for Change Order as approved by the City.

10.06. UNIT PRICE CHANGE ORDER

A. For predetermined unit prices and quantities, the Change Order will be executed on a fixed price basis.

B. For unit costs or quantities of units of work that are not predetermined, the Work shall be executed under a work directive change. A change in the Contract Sum or Contract Time will be computed as specified for the time and materials Change Order.

10.07. COST AND PERCENTAGE CHANGE ORDER

A. Contractor will submit an itemized account and supporting data after completion of the change.

B. The Development Services Director will determine the change allowable in the Contract Sum and Contract Time.

10.08. CORRELATION OF CONTRACTOR SUBMITTALS

A. Contractor will promptly revise schedule of values and application for payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum as shown on the Change Order.

B. Contractor shall promptly revise progress schedules to reflect any change in the Contract Time, revise subcontractor schedules to adjust times for other items of work affected by the change and resubmit for the Development Services Director's approval.

C. Contractor shall promptly record any required changes in project records and documents.

10.09. DIRECT COST DEFINITIONS

A. Labor

1. Cost of labor shall include any employer payments to or on behalf of workers for health, welfare, pension, vacation, and similar purposes. Labor rates will not be recognized when in excess of those prevailing in the locality and time the Work is being performed. The costs for all supervision including general superintendents and forepersons will be included in the markups established by the Contract Documents. The only exception to this will be working forepersons who perform actual manual labor. No labor charges will be accepted for engineering or proposal preparation. These costs will be included in the markups established by the Contract Documents.

2. Overtime and premium time pricing will only be allowed for labor which, based on mutual agreement, shall be performed outside of normal working hours.

B. Material

1. The actual cost to the Contractor for the materials directly required for the performance of the changed work. Such costs of materials may include the cost of transportation. No delivery charge will be allowed unless the delivery is specifically for the changed work.

2. If a trade discount by an actual supplier is available to the Contractor, it shall be credited to the City. If the materials are obtained from a supplier or source owned wholly by or in part by the Contractor, payment thereof will not exceed the current wholesale price for the materials. The term "trade discount" includes the concept of cash discounting.

3. If, in the opinion of the Development Services Director, the cost of the materials is excessive or if the Contractor fails to furnish satisfactory evidence of a cost to the Contractor from the actual supplier thereof, then, in either case, the cost of materials shall be deemed to be the lowest current wholesale price at which similar materials are available in the quantities required. The City reserves the right to furnish such materials as it deems advisable and the Contractor shall have no claims for cost or profits on materials furnished by the City.

C. Equipment

1. The actual cost to the Contractor for the use of equipment directly required in the performance of the changed work. In computing the hourly rental of equipment any time less than thirty (30) minutes shall be considered one-half hour. No payment will be made for time equipment is inoperative due to breakdown or for non-working days. In addition, the rental time shall omit the time required to move the equipment to the work, for rental of such equipment, and to return it to the source. No mobilization or demobilization will be allowed for equipment already on site. If such equipment is not moved by its own power, then loading and transportation costs will be paid in lieu of rental time thereof. However, neither moving time nor loading and transportation costs will be paid if the equipment is used on the project in any other way than upon the changed work.

2. Individual pieces of equipment having a replacement value of $1,000 or less shall be considered to be small tools or small equipment and no payment will be made on account thereof unless it is a direct expense for the changed work and is used for no other purpose.

3. The rental rate for equipment will not exceed that as recommended by the lower of the rental rates established by Caltrans or as contained in the Association of Equipment Distributors (AED) book.

4. The amount to be paid to the Contractor for the use of equipment as set forth above shall constitute full compensation to the Contractor for all costs incidental to the use of the equipment.

10.10. COST MARKUPS

A. For work performed by the Contractor in an amount equal to the direct costs (as defined in Section 10.09) for the work plus 15% of the direct cost for overhead and profit.

B. For work performed by a Subcontractor in an amount equal to the direct costs (as defined in Section 10.09) for the work plus 20% of the direct costs for overhead and profit. (Required breakdown: 15% to the Subcontractor, 5% to the Contractor.)

C. For work performed by a Sub-subcontractor (any tier) in an amount equal to the direct costs (as defined in Section 10.09) for the work plus 20% of the direct costs for overhead and profit. (required breakdown: 15% to the Sub-subcontractor, 2.5% to the Subcontractor and 2.5% to the Contractor.)

D. In no case will the total markups be greater than 20% of the direct cost notwithstanding the number of contract tier actually involved in the changed work.

E. On proposals covering both increases and decreases in the amount of the Contract Sum, overhead, profit and commission shall be allowed on both the net increase or net decrease as determined above. Where the difference is a deletion, for a deduction to Contractor's overhead, profit or commission shall be calculated.

F. The markup shall include all profit, small tools, cleanup, engineering, supervision, insurance, bonds, warranties, job site overhead and home office overhead. No markup will be allowed on taxes, insurance and bonds.

10.11. CLAIMS FOR EXTRA COST

If the Contractor claims that any instructions by the City that are not included as part of the Contract Documents, involve extra cost under the Contract Documents, the Contractor shall give the Development Services Director written notice thereof within three (3) days after the receipt of such instructions and in any event before proceeding to execute the Work, except in an emergency endangering life or property and the procedure shall then be as provided for changes in the Work. No such claim shall be valid unless so made, and Contractor expressly waives any claim not presented in accordance with this section.

10.12. CLAIMS FOR CONCEALED OR UNKNOWN CONDITIONS

A. The Contractor shall not be entitled to any adjustment in the Contract Sum or Contract Time for any concealed or unknown condition encountered in the performance of the Work if such condition: (1) is of a usual nature or does not differ materially from those ordinarily encountered and generally recognized as inherent to work of the nature provided for in the Contract Documents; (2) is of a usual nature or does not differ materially from those conditions disclosed or have been investigated or were reasonably inferable from the Contractor's prior work or should have been reasonably inferable by the Contractor from the Contract Documents and field conditions at the site of the project; or (3) is of a nature which the Contractor should reasonably have known or anticipated based on the area in which the site of the project is located, the type of building involved and the practices prevalent in the construction industry.

B. Notwithstanding the foregoing, however, if the Contractor makes a proper claim for an adjustment in the Contract Time or Contract Sum regarding special or concealed conditions which do not fall into the categories set forth above, the Development Services Director will promptly investigate such conditions. If such conditions differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, and the Contractor has timely and properly made its claim, the Development Services Director will recommend an equitable adjustment in the Contract Time or Contract Sum, or both. If the Development Services Director determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in either or both of the Contract Time and Contract Sum is justified, then the Development Services Director shall so notify the Contractor in writing, stating the reasons. For any claim for an adjustment in the Contract Time or Contract Sum to be made properly, such claim must be made by the Contractor in writing with specific detail as to the special or concealed condition and such notice shall be given to the Development Services Director promptly before conditions are disturbed and in no event later than three (3) days after first observance of any such conditions and if the Contractor is entitled to an adjustment in the Contract Time and/or Contract Sum, the Contractor shall make such claim within the three (3) day period. In no event shall the existence of any concealed or unknown conditions qualify or limit any of the Contractor's obligations under the Contract Documents, including, without limitation, the indemnity obligations set forth in Section 6 of the Contract for Construction.

11. UNCOVERING AND CORRECTION OF WORK

11.01. INSPECTIONS AND TESTS

A. Contractor shall, at all times, maintain proper facilities and provide safe access for inspection by City to all parts of the Work and to the shops where the Work is in preparation. Where sound construction practices or the Contract Documents require work to be tested or inspected, it shall not be tested or covered up without timely notice to the City or its authorized representative, of its readiness for review, and without the review thereof, or consent thereto of the City. Should any such work be covered up without such notice, review, or consent, such work must be uncovered for examination at Contractor's sole expense if required by the Development Services Director or its representative. Contractor shall submit, free of cost to the City, for testing, samples or specimens of any or all materials proposed to be used in the Work, if required to do so by the Development Services Director.

B. If, at any time, a material is challenged as to its conformity with the Contract Documents, by the City or its representative, it shall then be retested by an independent laboratory approved by the City and should it not conform, the cost of the tests and corrective measures are to be paid for by Contractor.

11.02. UNCOVERING OF WORK

Re-examination of questioned work may be ordered by the City and, if so ordered, the work must be uncovered by the Contractor. If such work is found to be in accordance with the Contract Documents, the City shall pay the cost of re-examination and replacement. If such work is found not to be in accordance with the Contract Documents, the Contractor shall pay the cost.

11.03. CORRECTION OF WORK BEFORE FINAL PAYMENT

A. The Contractor shall promptly remove from the premises all materials identified by the Architect or City as failing to conform to the Contract Documents, whether incorporated in the Work or not, and the Contractor shall promptly replace the rejected work to meet the requirements of the Contract Documents and without expense to the City and shall bear the expense of making good all work of other contractors destroyed or damaged by such removal or replacement.

B. If the Contractor does not remove such condemned work and materials within a reasonable time, fixed by written notice (not to exceed fifteen (15) days), the City may remove them and may store the materials at the expense of the Contractor. If the Contractor does not pay the expenses of such removal within ten (10) days thereafter, the City may, upon ten (10) days' written notice, sell such materials at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs and expenses that should have been borne by the Contractor.

11.04. CORRECTION OF WORK AFTER FINAL PAYMENT

Neither the final certificate nor any provision in the Contract Documents, nor payment, shall relieve the Contractor of responsibility for faulty materials or workmanship and unless otherwise specified, the Contractor shall remedy any defects due thereto and pay for any damage to other work resulting therefrom which shall appear within a period of one (1) year from the date of final payment.

12. RESOLUTION OF CONSTRUCTION CLAIMS

Any public works claim of $375,000.00 (Three Hundred Seventy-Five Thousand Dollars) or less which arises out of this contract is subject to the provisions of the Local Agency Public Construction Act, Public Contracts Code Section 20104, et seq. As used therein, "local agency" means City of Sonoma. The relevant sections of that Act provide as follows:

Section 20104

(b) (1) "Public work" has the same meaning as in Sections 3100 and 3106 of the Civil Code, except that "public work" does not include any work or improvement contracted for by the state or the Regents of the University of California.

(2) "Claim" means a separate demand by the contractor for (A) a time extension, (B) payment of money or damages arising from the work done by, or on behalf of, the contractor pursuant to the contract for a public work and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (C) an amount of payment of which is disputed by the local agency.

Section 20104.2

A. For any claim subject to the Act, the following requirements apply:

(a) The claim shall be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment. Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims.

(b) (1) For claims of less than fifty thousand dollars ($50,000), the local agency shall respond in writing to any written claim within 45 days of receipt of the claim, or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant.

(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.

(3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 15 days after receipt of the further documentation, or within a period of time no greater than that taken by the claimant in producing the additional information or requested documentation, whichever is greater.

(c) (1) For claims of over fifty thousand dollars ($50,000) and less than or equal to three hundred seventy-five thousand dollars ($375,000), the local agency shall respond in writing to all written claims within 60 days of receipt of the claim, or may

request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant.

(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.

(3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 30 days after receipt of the further documentation, or within a period of time no greater than that taken by the claimant in producing the additional information or requested documentation, whichever is greater.

(d) If the claimant disputes the local agency's written response, or the local agency fails to respond within the time prescribed, the claimant may so notify the local agency, in writing, either within 15 days of receipt of the local agency's response or within 15 days of the local agency's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the local agency shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(e) Following the meet and confer conference, if the claim or any portion remains in dispute, the claimant may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his or her written claim pursuant to subdivision (a) until the time that claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.

(f) This article does not apply to tort claims and nothing in this article is intended nor shall be construed to change the time periods for filing tort claims or actions specified by Chapter 1 (commencing with Section 900) and Chapter 2 (commending with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code.

All civil actions filed to resolve claims subject to this Act are subject to the provisions of Public Contracts Code Section 20104.4 and 20104.6 (b).

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DIVISION 1

GENERAL REQUIREMENTS

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SECTION 01 11 00

WORK SUMMARY

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Bid Documents for this project include the following:
   1. Site Drawings and Photographs, and
   2. Project Manual.

1.02 SCOPE OF WORK

A. The Contractor and his Subcontractors shall furnish all labor, materials, equipment, transportation, supervision, permits and incidents required to safely and legally perform the work for the Nursery School ADA & Maintenance Improvements including, but not limited to:

   1. Provide new ADA parking and path of travel.
   2. Interior ADA modifications.
   3. Removal and replacement of concrete walks and ramps
   4. Cleaning and caulking of existing exterior cracks.
   5. Removal and replacement of exterior shed roof.
   6. Interior and exterior painting.
   7. Casework.

B. It is the intent of the Bid Documents to include everything necessary and required for proper completion of the work. All work is to be performed as required to carry out the intent whether or not each individual items is specifically stated.

C. All work shall be performed in accordance with Bid Documents, industry standards, state and local requirements, federal requirements, and fire official requirements.

1.03 CONTRACTOR RESPONSIBILITIES

A. Contractor shall carefully compare and study the project, specifications, drawings and all other applicable Bid Documents. No “extras” shall be allowed for any errors, discrepancies or omissions that contractor failed to report to the Owner prior to award of the contract.

B. Contractors shall tour the project sufficiently, prior to the bid, to adequately bid the project, taking into consideration project delays and slower production due to compliance with all applicable.

C. Failure to examine the project building and the site and to become familiar with the existing conditions shall not constitute cause for a compliant or claim for extra payment. Accept project site as it exists.

D. Contractor shall notify the Owner of any condition not in conformance with the project requirements.

1.04 PROJECT DESCRIPTION

A. ADA and maintenance upgrades.

END OF SECTION

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SECTION 01 31 13

COORDINATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Provision of coordination of the Work of the Contract.

B. Related Sections: The completion of the work described in this Section may require work in or coordination with other Sections of these specifications. The Contractor and the sub-contractor shall be responsible for identifying and including all related work in other Sections of these specifications and/or drawings necessary for a complete installation of the work described in this Section. These related Sections include but are not limited to the following:

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

1.02 GENERAL COORDINATION

A. Contractor shall be responsible for all project coordination.

B. Coordinate schedules, submittals, and work of the various trades to ensure efficient and orderly sequence of installation of construction, with provisions for accommodating items to be installed later. Coordinate the work among the Specifications and Drawings. Work shown on any drawing or specification is required by the Contract irrespective of the trade subdivision. Contractor shall require each trade subcontractor to review all other subdivisions of the documents for related work and shall coordinate the subcontracts accordingly.

C. Require all parties involved in the performance of the Work to cooperate in the overall coordination of the work under the direction of the Contractor. Each party, when requested to do so, shall furnish information concerning its portion of the work, and shall respond promptly and reasonably to the decisions and requests of persons designated with coordination, supervisory, administrative, or similar authority.

D. The Drawings use graphic symbols to show certain physical relationships of the various elements and systems and their interfacing with other elements and systems. Establishing and coordinating the actual physical relationships is the responsibility of the Contractor. Layout and arrange all elements to contribute to safety and efficiency while maintaining the intent of the design. Before work proceeds in areas of potential conflict for installing different components of the work, Contractor shall prepare supplementary drawings for review by the Owner and resolve the conflict.

E. Coordinate completion and cleanup Work of various trades in preparation for the Completion.

1.03 SUBCONTRACT COORDINATION

A. Coordinate the Work and do not delegate responsibility for coordination to any Subcontractor.

B. Anticipate the interrelationship of all Subcontractors and their relationship with the Work.

C. Resolve differences or disputes between Subcontractors concerning coordination, interference, or extent of work between sections of the specifications. Contractor's decisions, if consistent with the Contract Document requirements, shall be final.

1. If the Architect is required to resolve disputes between the Contractor and his Subcontractors, all associated costs will be billed directly to the Contractor as Additional Services by the Architect.

D. Coordinate the work of Subcontractors so that their portions of the work are performed in a manner that minimizes interference with the progress of the Work.

1.04 ADMINISTRATION

A. General: The Contractor shall prepare a written memorandum on required coordination activities. Include such items as required notices, reports and attendance at meetings. Distribute this memorandum to each trade performing work at the project site. Prepare similar memorandum for separate contractors where interfacing of their work is required.

B. Coordination Meetings: Conduct general project coordination meetings with Subcontractors at least weekly at regularly scheduled times convenient for all parties involved. The coordination meetings shall be held far enough in advance of a particular Subcontractors work so as to avoid conflict with the work of other trades. Request representation at each meeting by every party currently involved in coordination or planning for the work of the entire project. Keep the Owner informed about coordination meetings. Conduct meetings in a manner which will resolve coordination problems. Record results and minutes of each meeting and distribute copies to everyone in attendance and to the Owner. Owner may attend weekly jobsite meetings with subcontractors.

C. Superintendent: Provide a full-time Superintendent experienced in administration and supervision of building construction. This Superintendent shall be authorized to act as general coordinator of interfaces between units of work. This Superintendent shall be on site, during the construction period as needed to coordinate and supervise the work. Construction coordination shall be his/her principal duty.

1. For the purpose of this provision,"Interface" is defined to include scheduling and sequencing of work, sharing of access to work spaces, installations, protection of each other's work, cutting and patching, tolerances, cleaning, selections for compatibility, preparation of coordination drawings, inspections, tests, and temporary facilities and services.

1.05 COORDINATION WITH WORK PERFORMED BY OWNER UNDER SEPARATE CONTRACTS

A. The Owner will be performing work related to the project under separate contracts, including but not limited to vehicle lifts and exterior signage.

B. Contractor is responsible for coordinate with the work of other contractors, including scheduling and work necessary for other contractors to perform their work including but not limited to block outs, bracing, blocking, reinforcement, and electrical and mechanical connects.

C. Use Coordination Drawings of structural, mechanical, and electrical Work, together with shop drawings and layout drawings of affected Work to check, coordinate and integrate the Work to prevent interferences.

D. Contractor shall coordinate shop drawings to include any and all penetrations of framing members and finish material resulting from the coordination of and with the work of the Owner's mechanical and electrical subcontractors.

E. Do not install any finishes that may impact the work of Owner's Contractor's without prior review and approval of Architect.

1.06 COORDINATION WITH PUBLIC UTILITY AND SAFETY PROVIDERS

A. These providers include, but are not limited to: The local Fire Department, electrical, gas, internet and telephone providers, and the City of Sonoma.

B. Contractor is responsible for coordination with all utility service that may be affected by the project.

C. Public utility hookup fees shall be paid by the Owner.

1.07 COORDINATION WITH CITY STAFF AND PUBLIC

A. Contractor to coordinated activities so as to not disrupt the functioning of the building and the use by city staff and the public. Contractor is to ensure the safety of the city staff and the public for the duration of the project.

END OF SECTION

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SECTION 01 31 21

PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included: To enable orderly review during progress of the Work, and to provide for systematic discussion of problems, the Architect will conduct project meetings throughout the construction period.

B. Related Work Described Elsewhere: The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility and are not part of project meetings contents.

1.02 QUALITY ASSURANCE

A. Persons designated by the Contractor to attend and participate in the project meetings shall have all required authority to commit the Contractor to solutions agreed upon in the project meetings.

1.03 SUBMITTALS

A. Agenda Items: To the maximum extent practicable, advise the Architect at least 24 hours in advance of project meetings regarding all items to be added to the agenda.

B. Minutes: The Contractor will compile minutes of each project meeting and will furnish copies to the Owner and Architect. The Contractor may make and distribute such other copies as he wishes.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 MEETING SCHEDULE

A. Except as noted below for Preconstruction Meeting, project meetings will be held weekly. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.02 MEETING LOCATION

A. To the maximum extent practicable, meetings will be held at the job site.

3.03 PRE-CONSTRUCTION MEETING

A. Preconstruction Meeting will be scheduled within ten days after the Owner has issued Notice to Proceed. Provide attendance by authorized representatives of the Contractor and all major subcontractors. The Architect will advise other interested parties and request their attendance.

B. Minimum Agenda: Distribute data on and discuss:

1. Organizational arrangement of Contractor's forces and personnel and those of subcontractors, materials suppliers and Architect.

2. Channels and procedures for communications.

3. Construction Schedule, including sequence of critical work.

4. Contract Documents, including distribution of required copies of original Documents and revisions.

5. Processing of Shop Drawings and other data submitted to the Architect for review.

6. Processing of field decisions and Change Orders.

7. Rules and regulations governing performance of the work.

8. Procedures for safety and first aid, security, quality control, housekeeping, and other related matters.

3.04 PROJECT MEETINGS

A. Attendance: To the maximum extent practicable, assign the same person to represent the Contractor at project meetings throughout progress of the work. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspects of the Work are involved.

B. Minimum Agenda:

Review, revise as necessary and approve minutes of previous meeting.

Contractor shall provide:

Current Weekly Report
Three-Week Look Ahead Schedule

Review progress of the Work since last meeting, including status of submittals for approval.

Identify problems which impede planned progress.

Develop corrective measures and procedures to regain planned schedule.

Complete other current business.

END OF SECTION

SECTION 01 32 33

APPLICABLE STANDARDS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included:

1. Throughout the Contract Documents, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.

2. Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is the Contractor's responsibility to provide materials and workmanship which meet or exceed the specifically named code or standard.

3. It is also the Contractor's responsibility, when so required by the Contract Documents or by written request from the Owner and Architect, to deliver to the Owner and Architect all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard. Such proof shall be in the form requested in writing by the Owner and Architect and generally will be required to be copies of a certified report of tests conducted by a testing agency approved for that purpose by the Owner and Architect.

B. All measurements shall be in imperial units.

C. Related Work Described Elsewhere: Specific naming of codes or standards occurs on the Drawings and in other Sections of these Specifications.

1.02 QUALITY ASSURANCE

Familiarity with Pertinent Codes and Standards: In procuring all items used in this Work, it is the Contractor's responsibility to verify the detailed requirements of the specifically named codes and standards and to verify that the items procured for use in this Work meet or exceed the specified requirements.

Rejection of Non-Complying Items: The Owner and Architect reserves the right to reject items incorporated into the Work which fail to meet the specified minimum requirements. The Owner and Architect further reserves the right, and without prejudice to other recourse the Owner and Architect may take, to accept non-complying items subject to an adjustment in the Contract Amount as approved by the Owner and Architect.

Applicable Standards listed in these Specifications include, but are not necessarily limited to, standards promulgated by the following agencies and organizations:

ASSHTO = American Association of State Highway and Transportation Officials, 341 National Press Building, Washington, D.C. 20004.

ACI = American Concrete Institute, Box 19150, Redford Station, Detroit, Michigan 48129.

AISC = American Institute of Steel Construction, Inc., 1221 Avenue of the Americas, New York, New York 10020.

ANSI = American National Standards Institute (successor to USASI and ASA), 1430 Broadway, New York, New York 10018.

ASTM = American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

AWS = American Welding Society, Inc., 2501 N.W. 7th Street, Miami, Florida 33125.

AWWA = American Water Works Association, Inc., 6666 West Quincy Avenue, Denver, Colorado 80235.

CRSI = Concrete Reinforcing Steel Institute, 228 North LaSalle Street, Chicago, Illinois 60610.

CS = Commercial Standard of NBS, U.S. Department of Commerce, Government Printing Office, Washington, D.C. 20402.

FGMA = Flat Glass Marketing Association, 3310 Harrison, Topeka, Kansas 66611.

NAAMM = National Association of Architectural Metal Manufacturers, 1033 South Boulevard, Oak Park, Illinois 60302.

NEC = National Electrical Code (see NFPA).

NEMA = National Electrical Manufacturers Association, 155 East 44th Street, New York, New York 10017.

NFPA = National Fire Protection Association, 470 Atlantic Avenue, Boston, Massachusetts 12210.

SDI = Steel Deck Institute, 135 Addison Avenue, Elmhurst, Illinois 60125.

SSPC = Steel Structures Painting Council, 4400 5th Avenue, Pittsburgh, Pennsylvania 15213.

TCA = Tile Council of America, Inc., P.O. Box 326, Princeton, New Jersey 08540.

UL = Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, Illinois 60611.

CBSC = 2013 California Building Standard Code.

ICC = International Code Council - 5203 Leesburg Pike, Suite 600; Falls Church, VA 22041-3401.

Fed. Specs. and Fed Standards: Specifications Sales (3FRI), Bldg. 197, Washington Navy Yard, General Services Administration, Washington, D.C. 20407.

END OF SECTION

SECTION 01 33 24

SUBMITTALS AND SUBSTITUTIONS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included:
   1. Make submittals required by the Contract Documents, and revise and resubmit as necessary to establish compliance with the specified requirements.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
   2. Individual requirements for submittals also may be described in pertinent Sections of these Specifications.
   3. See General Conditions for submittal of schedules, cost breakdown, subcontractors' list, etc.

C. Work not included:
   1. Unrequired submittals will not be reviewed by the Architect.
   2. The Contractor may require his subcontractors to provide drawings, setting diagrams, and similar information to help coordinate the Work, but such data shall remain between the Contractor and his subcontractors and will not be reviewed by the Architect.

1.2 QUALITY ASSURANCE

A. Coordination of submittals:
   1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.
   2. Verify that each item and the submittal for it conform in all respects with the specified requirements.
   3. Shop drawings shall be submitted by the Contractor. Shop drawings shall be stamped and signed by the Contractor showing that they have been reviewed and approved by him/her before being sent to the Architect.

      a. Details shall be identified by reference number to sheet and detail, schedule or room numbers on the Contract Drawings.

      b. Submittals that have not been reviewed by the Contractor and do not bear a stamp of review by the Contractor will be returned and will not be reviewed by the Architect.

   4. All Shop Drawings and material submittals shall be numbered in sequence of submittal. Resubmittals shall receive a new number.
   5. Fabrication of work shall not be started or any parts shipped or transported to the job site prior to the review of shop drawings by the Architect, and compliance with the Contract Documents has been verified.
   6. The Contractor shall assume full responsibility for coordinating and verifying schedules, quantities and dimensions shown on Shop Drawings. The Architect assumes no responsibility for checking schedules, quantities or dimensions.

B. Substitutions:
   1. The Contract is based on the standards of quality established in the Contract Documents. Substitutions will be considered only when substantiated by the Contractor's submittal of required data within 5 calendar days after the Notice to Proceed. Only one substitution request will be considered for each specified item. Unless noted otherwise in a specific Section of the Specifications after 5 calendar days after the Notice to Proceed it will be assumed all items are to be as specified in these documents and substitutions may not be accepted by the Architect. It shall be the Contractor's responsibility to notify the Architect in writing, of any deviations in the submittals from the requirements of the Contract Documents.

   3. The following products do not require further approval except for interface within the Work:
      a. Products specified by reference to standard specifications such as ASTM and similar standards.

b. Products specified by manufacturer's name and catalog model number.
c. The Contractor, however, shall submit to the Architect a letter stating that the products submitted will be as stated in a. and b. above.

4. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved in writing for this Work by the Architect.

C. Time for review of substitutions:
1. In the interest of time, substitutions are not encouraged unless absolutely unavoidable. When submitting an item for substitution for a specified item, submit all pertinent data required to enable the Architect to make an accurate and timely evaluation. Incomplete submittals or insufficient data will be cause for the submittal to be rejected.
2. Requests for extension of the time directly or indirectly related to approval of substituted items will not be granted.
3. Additional review time by the Architect caused by a substitution shall in no way be charged as a delay to the Project.
4. It shall be the sole responsibility of the Contractor to avoid delays through the process of substitution.

D. "Or equal":
1. Where the phrase "or equal," or "as approved equal," occurs in the Contract Documents, do not assume that the materials, equipment, or methods will be considered as equal unless the item has been specifically so reviewed by the Architect and deemed in conformance with design intent and quality established for this Work.
2. The decision of the Architect shall be final.
3. If submittals on "or equal" items are not made within the prescribed time or are incomplete, then the item or material originally specified shall be supplied.

1.3 SUBMITTALS

A. Make submittals of Shop Drawings, Samples, substitution requests, and other items in accordance with the provisions of this Section.

B. Submittals shall include all technical and performance data on the product or material required for the Architect to make a fair evaluation, including physical samples if deemed necessary by the Architect.

C. Incomplete submittals will be returned to the Contractor and will not be reviewed by the Architect. The Contractor shall be solely responsible for any delays caused by making incomplete submittals

D. For purposes of uniformity, only one make and/or brand of material will be accepted for each type of material used. All electrical material shall be listed by Underwriters Laboratories, Inc., and shall meet their requirements and bear their label.

PART 2 - PRODUCTS

2.1 SHOP DRAWINGS

A. Scale and measurements: Make Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the Work.

B. Types of prints required:
1. Submit Shop Drawings in the form of one reproducible transparency of each sheet plus two blueline or blackline prints of each sheet.
2. Blueprints alone will not be acceptable.

C. Review comments of the Architect will be shown on the transparency when it is returned to the Contractor. The Contractor may make and distribute such copies as are required for his purposes.

D. Review of Shop Drawings and submittals is only for general conformance with the design concept, colors, texture of material and general compliance with the Contract Documents. Any action indicated or shown is subject to the requirements of the Contract Drawings and Specifications. Review of Shop Drawings is not intended to modify or change in any way the Contract Documents (any deviations shall be separately stated in writing). The Contractor shall be solely responsible for fabrication processes and methods, field dimensions and quantities.

2.2 MANUFACTURERS' LITERATURE

A. Where contents of submitted literature from manufacturers includes data not pertinent to the submittal, clearly show which portions of the contents is being submitted for review.

B. Submit the number of paper copies which are required to be returned, plus three copies which will be retained by the Architect or submit one electronic copy in PDF format to the Owner and Architect.

2.3 SAMPLES

A. Provide Sample or Samples identical to the precise article proposed to be provided. Identify as described under "Identification of submittals" below.

B. Number of Samples required:
   1. Unless otherwise specified, submit Samples in the quantity which is required to be returned, plus one which will be retained by the Architect.

2.4 COLORS AND PATTERNS

A. Unless the precise color and pattern is specifically called out in the Contract Documents, and whenever a choice of color or pattern is available in the specified products, submit accurate color and pattern charts to the Architect for selection.

B. Within 10 days from the Notice to Proceed, General Contractor shall submit to the Architect a list of manufacturers of all products or materials requiring color selections, which will be used on the job. Samples of the manufacturer's complete color range shall also be submitted at this time. Color selections will not be made by the Architect until color samples for all items to be selected have been submitted. The Architect will not make partial color selections.

C. Failure of the Contractor to submit all color charts for all products or materials requiring color selections within 10 days, thus requiring additional time for the Architect to make selections, shall not be grounds for a delay claim.

D. Allow 10 working days after the receipt of all color lists of all products or materials requiring color selections for the Architect to make color selections.

E. All concrete colors including the natural concrete color shall have 3'x3' samples poured in place on site. Review and approval by Architect is required for all concrete colors and finish prior to final placement.

PART 3 - EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

A. Each submittal shall be numbered or named consecutively by the Contractor and all documentation shall refer to that number.
   1. When material is resubmitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
   2. On resubmittals, cite the original submittal number for reference.

B. Accompany each submittal with a letter of transmittal or e-mail showing all information required for identification and checking.

C. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.

D. Maintain an accurate submittal log for the duration of the Work, showing current status of all submittals at all times. Make the submittal log available to the Architect for his review upon request.

3.2 GROUPING OF SUBMITTALS

A. Unless otherwise specified, make submittals in groups containing all associated items to assure that information is available for checking each item when it is received.
   1. Partial submittals may be rejected as not complying with the provisions of the Contract.
   2. The Contractor may be held liable for delays so occasioned.

3.3 TIMING OF SUBMITTALS

A. Make submittals far enough in advance of scheduled dates for installation to provide time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery. The Contractor will be solely responsible for any delays caused by not making submittals in time for proper review.

B. In scheduling, allow Sufficient time for review by the Architect following his receipt of the submittal as set forth in the General Conditions.

3.4 ARCHITECT'S REVIEW

A. Review by the Architect does not relieve the General Contractor from responsibility for errors which may exist in the submitted data nor does review by the Architect relieve the Contractor from responsibility or in any way change the original Contract.

B. Revisions:
   1. Make revisions required by the Architect.
   2. If the Contractor considers any required revision to be a change, he shall so notify the Architect as provided for in the Contract Documents.
   3. Make only those revisions directed by the Architect.

C. Reimbursement of Architect's costs:
   1. In the event substitutions are proposed to the Architect after the Contract has been awarded, the Architect will record all time used by him and by his consultants in evaluation of each such proposed substitution.

   2. Whether or not the Architect approves a proposed substitution, the Contractor promptly upon receipt of the Architect's billing shall reimburse the Architect at his standard billing rates and that of his consultants for all time spent by them in evaluating the proposed substitution.

   3. If the Contractor does not reimburse the Architect for all time spent by them in evaluating the proposed substitution, with the authorization of the Owner, the amounts due the Architect will be deducted from the pay request.

END OF SECTION

SUBSTITUTION REQUEST FORM

TO: STRATAap

PROJECT:

We hereby submit for your consideration the following product instead of the specified item for the above project:

Section Paragraph Specified Item

Proposed Substitution:

Attached complete technical data, including laboratory tests, if applicable.

Include complete information on changes to Drawings and/or Specifications, which proposed substitution will require for its proper installation.

Fill in blanks below:

What affect does the substitution have on other trades?

Yes No

Does the substitution affect dimensions shown on the Drawings?

Differences between proposed substitution and specified item?

Manufacturer's guarantees of the proposed and specified items are:
o Same o Different (explain on attachment)

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

Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution? Yes No

Submitted by:
Contractor
Street Address
City, CA Zip

By: _____

Firm: _____

Phone: Fax:

Date: _____

For use by Architect/Engineer:

o Accepted o Accepted as noted o Not Accepted o Received too late

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SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

1. Section 01 33 24 "Substitution Procedures" for requests for substitutions.

1.2 DEFINITIONS

A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 ACTION SUBMITTALS

A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within [15] days of receipt of request, or [seven] days of receipt of additional information or documentation, whichever is later.

a. Form of Approval: As specified in Section 01 33 24 "Submittal Procedures."
b. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
3. Refer to other Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01 77 00 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
3. Products:

   a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience **may be** considered **by the City**.
   b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.

4. Manufacturers:

   a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience may be considered by the City.
   b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:

1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

END OF SECTION

SECTION 01 71 13

MOBILIZATION AND DEMOBILIZATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Mobilization and demobilization requirements.

1.02 DEFINITIONS

A. Mobilization includes bringing in all necessary equipment to the site to do the work. It also includes all labor materials and equipment to set up temporary offices, structures, facilities, signs and utilities.
B. Demobilization includes removing all construction equipment and debris so site is left clean.

1.03 TEMPORARY FACILITIES

A. Field Office: CONTRACTOR'S OPTION (Not required). If provided, the Contractor's field office must be confined to the designated staging area as determined by the City's project manager.

B. Phone: Contractor shall maintain a mobile phone on site at all times with a number available to the Project Manager and Architect.

C. Utilities: Owner will provide power, water and sanitary facilities. Contractor shall provide all other temporary utilities required.

D. Construction and Support: Set up and maintain in a neat and orderly manner temporary enclosures, identification signs, and waste material disposal.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Temporary Materials: CONTRACTOR'S OPTION.

PART 3 - EXECUTION

3.01 INSTALLATIONS

A. Relocate and modify temporary facilities as required.
B. Install temporary utility service or connect to existing service.
C. Locate field office, storage sheds, sanitary facilities and other temporary construction and support facilities for easy access and within the staging area shown on the plans. Use of gasoline-burning, open flame or salamander type heating units is prohibited.
D. Conform to local standards and codes for erection of adequate fences and barricades. Maintain all signing, barricades, fencing, drainage, and other items as required to protect public and private property from damage caused by demolition operations.
E. Coordinate location of storage areas to avoid interference with drainage, traffic, or private property.
F. Provide and maintain all temporary signage required by the Work.
G. Provide and install safety barriers as required by the work to protect employees and the public.

3.02 REMOVALS

A. Completely remove temporary materials and equipment:
   1. At completion of work.
B. Clean and repair damage caused by installation of temporary facilities.
C. Restore areas to original or to specified conditions at completion of the Work.

END OF SECTION

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SECTION 01 73 29

CUTTING AND PATCHING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included: This Section establishes general requirements pertaining to cutting (including excavating), fitting, and patching of the Work required to:

1. Make the several parts fit properly.
2. Removal of weather damaged material in preparation for replacement.
3. Uncover Work to provide for installation, inspection or both of ill-timed Work.
4. Remove and replace Work not conforming to requirements of the Contract Documents.
5. Remove and replace defective work.
6. Remove and replace work described in the contract documents.

B. Related Work Described Elsewhere:

1. In addition to other requirements specified, upon the Owner's request, uncover Work to provide for inspection by the Owner of covered Work, and remove samples of installed materials for testing.
2. Do not cut or alter work performed under separate contract without the Owner's written permission.

1.02 QUALITY ASSURANCE

A. Perform all cutting and patching in strict accordance with pertinent requirements of these Specifications and, in the event no such requirements are determined, in conformance with the Owner's written direction.

1.03 SUBMITTALS

A. Request for the Owner 's Consent:

1. Prior to cutting which affects structural safety, submit written request to the Owner for permission to proceed with cutting.
2. Should conditions of the Work, or Schedule, indicate a required change of materials or methods for cutting and patching, so notify the Owner and secure his written permission prior to processing.

B. Notice to the Owner:

1. Prior to cutting and patching performed pursuant to the Owner's instructions, submit cost estimate to the Owner. Secure the Owner's approval of cost estimates and type of cost reimbursement before proceeding with cutting and patching.
2. Submit written notice to the Owner designating time the Work will be uncovered, to provide for the Owner's observation.

PART 2 - PRODUCTS

2.01 MATERIALS

A. For replacement of Work removed, use materials which comply with the pertinent Sections of these Specifications.

PART 3 - EXECUTION

3.01 CONDITIONS

A. Inspection:

1. Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, backfilling, and patching.
2. After uncovering the Work, inspect conditions affecting installation of new Work.

B. Discrepancies:

1. If uncovered conditions are not as anticipated, immediately notify the Owner and secure needed directions.
2. Do not proceed in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 PREPARATION PRIOR TO CUTTING

A. Provide all required protection including, but not necessarily limited to, shoring, bracing, and support to maintain structural integrity of the Work.

3.03 PERFORMANCE

A. Perform cutting and demolition by methods which will prevent damage to other portions of the Work and will provide proper surfaces to receive installation of repair and new work. Perform fitting and adjustment of products to provide finished installation complying with the specified tolerances and finishes.

B. The Contractor shall do all cutting, fitting or patching of its work that may be required to make its several parts come together properly and fit it to receive or be received by work of other contractors shown upon, or reasonably implied by, the Drawings and Specifications for the completed structure, and Contractor shall make good after them.

C. Contractor shall match existing and adjoining materials and details wherever possible. Re-use of existing materials may be allowed only where specifically designated in the Contract Documents or approved by the Architect or Owner.

D. The Contractor shall not endanger any work by cutting, digging or otherwise and shall not cut or alter the work of any other contractor, without the prior written consent of the Owner.

E. Contractor shall uncover out-of-sequence, defective and non-conforming work, provide openings for penetrations of existing surfaces and provide samples for testing. Contractor shall seal penetrations through floors, walls and ceilings.

END OF SECTION

SECTION 01 74 13

CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included: Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section.

B. In addition to standards described in this Section, comply with all requirements for cleaning up as described in various other Sections of these Specifications.

C. Related Sections: The completion of the work described in this Section may require work in or coordination with other Sections of these specifications. The Contractor and the sub-contractor shall be responsible for identifying and including all related work in other Sections of these specifications and/or drawings necessary for a complete installation of the work described in this Section. These related Sections include but are not limited to the following:

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

1.02 QUALITY ASSURANCE

A. Inspection: Conduct daily inspection, and more often if necessary, to verify that requirements of cleanliness are being met.

B. Codes and Standards: In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having jurisdiction.

PART 2 - PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

A. Provide all required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.02 COMPATIBILITY

A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the architect.

PART 3 - EXECUTION

3.01 PROGRESS CLEANING

A. General:

1. Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of materials.

2. Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this Work.

3. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.

4. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the ecology.

B. Site:

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.

2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site; restock, tidy, or otherwise service all arrangements to meet the requirements of subparagraphs 3.1.1.

3. Maintain the site in a neat and orderly condition at all times.

C. Structures:

1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.

2. Weekly, and more often if necessary, sweep all interior spaces clean. "Clean," for the purpose of this sub-paragraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and hand-held broom.

3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using all equipment and materials required to achieve the required cleanliness.

4. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials have been installed. "Clean," for the purpose of this subparagraph, shall be interpreted as meaning free from all foreign material which, in the opinion of the architect may be injurious to the finish floor material.

3.02 FINAL CLEANING

A. Definition: Except as otherwise specifically provided, "clean," for the purpose of this Article, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaning using commercial quality building maintenance equipment and materials.

B. General: Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Article 3.01 above.

C. Site: Unless otherwise specifically directed by the architect, broom clean all paved areas on the site and all public paved areas directly adjacent to the site. Completely remove all resultant debris.

D. Structures:

1. Exterior: Visually inspect all exterior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with water, the architect may require light sandblasting or other cleaning at no additional cost to the City.

2. Interior: Visually inspect all interior surfaces and remove all traces of soil, waste material, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. Remove all paint dropping, spots, stains, and dirt from finished surfaces. Use only the specified cleaning materials and equipment.

E. Timing: Schedule final cleaning as approved by the architect to enable the City to accept a completely clean project.

END OF SECTION

SECTION 01 77 00

PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 SUMMARY

A. This Section describes contract closeout procedures including:

1. Project record documents
2. Product Data
3. Operation and Maintenance data
4. Removal of temporary construction facilities
5. Final completion
6. Final cleaning
7. Material, equipment and finish data
8. Project guarantee
9. Warranties
10. Restorative and Remedial Work
11. Turn-in
12. Fire Inspection Coordination
13. Building Inspection Coordination

B. Related Sections: The completion of the work described in this Section may require work in or coordination with other Sections of these specifications. The Contractor and the sub-contractor shall be responsible for identifying and including all related work in other Sections of these specifications and/or drawings necessary for a complete installation of the work described in this Section. These related Sections include but are not limited to the following:

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

1.02 PROJECT RECORD DOCUMENTS

A. Maintenance of Documents and Samples:

1. Store Project documents and samples in field office apart from documents used for construction.
2. Maintain Project documents in a clean, dry, legible condition and in good order.
3. Do not use Project record documents for construction.

B. Recording:

1. Record information carefully and neatly, with felt tip pens, in color code designated, and in the manner approved in advance by the Architect.

a. Information recording will be continuous throughout construction. Information shall be recorded at the time of event(s) and shall be available at all times for review by the Architect and Owner.

2. Label each document “Project Record” in large, neat, printed letters.

C. Record Drawings:

1. Record the following kinds of information on black line or blue line prints or in electronic PDF format:

a. Changes made by Change Orders and other modifications described in the General Conditions.
b. Locations of work buried under or outside the building, such as plumbing and electrical lines and conduits.
c. Locations of work concealed inside the building whose general location is changed from that shown on the Contract Documents.
d. Locations of items, not necessarily concealed, which have been changed, with the Architect’s prior acceptance, from the locations indicated on the Contract Documents.
e. Locations of significant items such as main power disconnect, main water and gas shutoffs, motor disconnects, filters, controls, isolating valves and the like shall be highlighted on the record drawings.
f. Provide line diagrams of all installed electrical power, lighting, switching, low voltage, security electronics, subpanels, meter mains, termination points, transformers and systems.
g. In addition to the previously specified requirements for record drawings:
Keep up to date during the entire progress of the work, and make available to the Architect. Furnish additional drawings necessary for clarification.
Record deviations from the sizes, locations, and other features of installations shown in the Contract Documents. Establish locations of underground work by dimensions to column lines or walls, locating turns, and by referenced centerline or invert elevations and rates of fall. Give sufficient information to locate work concealed in the Building. Drawing to Scale:
Locate main runs of piping, conduit, ductwork, and similar items by dimensions.
Locate other items either by dimensions or in relation to spaces within the building.

2. Furnish reproducible record drawings, made from final Shop Drawings, updated to show actual conditions, for specified work.

D. “As-Built” Drawings:

1. At time of acceptance of the work and prior to final payment, using the record drawings for reference, prepare “As-Built” drawings on permanent, transparent, reproducible prints or in electronic PDF format that will be furnished by the Architect and paid for by the Owner.

2. Employ a professional draftsman to prepare the “As-Built” drawings from the record drawings; record information in ink in electronic PDF format.

E. Specifications and Addenda:

1. Mark each Specification Section to record:

a. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment incorporated in the work.
b. Changes made by Change Order and other modifications described in the General Conditions.

F. Large Scale Layout Drawings:

1. The preparations of large scale detailed layout drawings are required for the coordination of the work, specifically Divisions 15 and 16 of the Specifications. These layout drawings are not Shop Drawings as defined by the General Conditions, but, together with Shop Drawings or layout drawings of affected Sections, are used to check, coordinate, and integrate the work of the various Sections.

2. Provide layout drawings as part of the Project record documents.

G. Record Construction Schedule: Using the latest Progress Schedule required by Section 01 32 16 as a reference, submit a Record Construction Schedule showing the actual dates and duration of construction activities.

H. Sign and date the completed Project record documents; deliver to the Architect who will deliver to the Owner after Final Acceptance of the Work.

1.03 PRODUCT DATA

A. Furnish three copies of manufacturers' product data, specifications, installation instructions, and maintenance instructions for products incorporated in the work; information specified herein shall be for products in addition to equipment items requiring operating and maintenance data specified elsewhere in this Section. All product data pertaining to an item shall be assembled together.

B. Sign and date the completed product data, and submit to the Architect, who will deliver them to the Owner.

1.04 OPERATING AND MAINTENANCE DATA

A. General: Where maintenance manuals, record data, and operating instructions are specified, assemble in three ring, plastic binders sized for 8-1/2" x 11" sheets or in electronic PDF format; include the following:

1. Identification on, or readable through, the front cover containing the Project name and address and the general subject matter in the manual.

2. Typewritten index near the front of the manual indicating locations of emergency data for equipment included in the manual.

3. Instructions regarding operation and maintenance of the equipment included in the manual.

4. Replaceable parts, part numbers, cost, and name and address of nearest parts distributor.

5. Copy of each warranty and service contract issued for the equipment included in the manual.

6. Include additional data required for the Owner's operation and maintenance.

B. Catalog Data: Where contents of manuals include manufacturers' catalog pages, indicate the items included in the Project and delete data which is not applicable.

C. Shop Drawings: Furnish one set of reviewed or revised Shop Drawings showing changes made during construction and/or installation.

D. Number of Copies Required:

1. Submit manuals in the quantity required to be returned, plus the following which will be retained by the Architect:

a. Two copies of other manuals; In lieu of paper copies, manuals may be submitted in electronic PDF format.

1.05 INSTRUCTION OF THE OWNER'S PERSONNEL

A. Furnish qualified personnel for on the job instruction of the Owner's operating and maintenance personnel.

1.06 REMOVAL OF TEMPORARY CONSTRUCTION FACILITIES

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 permanent facilities used during construction to specified condition.

1.07 SUBSTANTIAL COMPLETION

A. When Contractor considers Work or designated portion of the Work as substantially complete, Contractor shall submit written notice to Owner, with list of items to be completed or corrected.

B. Within reasonable time, Architect and Owner will inspect to determine status of completion.

C. Should Architect and Owner determine that Work is not substantially complete, Owner will promptly notify Contractor in writing, listing all defects and omissions.

D. Contractor shall remedy deficiencies and send a second written notice of substantial completion. Owner and Architect will reinspect the Work. If deficiencies previously noted are not corrected on reinspection, then Contractor shall pay the cost of the reinspection.

E. When Owner and Architect concurs that Work is substantially complete, Owner will issue a Certificate of Substantial Completion, accompanied by Contractor's list of items to be complete or corrected as verified by Owner and Architect.

F. Manufactured units, equipment and systems that require startup must have been started up and run for periods prescribed by Owner before a Certificate of Substantial Completion will be issued. The term "Substantial Completion" is defined in the General Conditions of the Contract.

1. Certification that all mechanical, electrical, plumbing, and hardware equipment has been tested and is operational. The Contractor will provide copies of all test results and reports including a binder by division fully indexed, outlining all equipment and performance tests. See Section 01 33 24 - Submittals and Substitutions.

1.08 COMMISSIONING:

A. Building Commissioning:

1. Not Applicable

1.09 FINAL COMPLETION

A. Final Completion is defined in the General Conditions. Final Completion occurs when Work meets requirements for Owner's Final Acceptance. When Contractor considers Work is finally complete, submit written certification that:

1. Contractor has inspected Work for compliance with Contract Documents, and all requirements for Final Acceptance have been met.

2. Except for Contractor maintenance after Final Acceptance, Work has been completed in accordance with Contract Documents and deficiencies listed with Certificate of Substantial Completion have been corrected. Operation of equipment and systems have been reviewed with Owner Maintenance and Operational personnel, have been tested in the presence of Owner's representative, and are operative.

3. Work is complete and ready for final inspection.

B. In addition to submittals required by conditions of Contract, Contractor shall provide submittals required by governing authorities and submit final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.

C. When Architect and Owner finds Work is acceptable and final submittal is complete, Owner will issue final change order reflecting approved adjustments to Contract Sum not previously made by Change Order. Should Architect or Owner determine that Work is incomplete or defective:

1. Owner promptly will so notify Contractor, in writing, listing the incomplete or defective items.

2. Contractor shall promptly remedy the deficiencies and notify the Owner when it is ready for re inspection.

3. When Architect and Owner determine that the Work is acceptable under the Contract Documents, Owner will request Contractor to make closeout submittals.

D. Final adjustments of accounts:

1. Contractor shall submit a final statement of accounting to Owner, showing all adjustments to the Contract Sum and complete and execute a notarized Final Lien Release.

2. If so required, Owner shall prepare a final Change Order for submittal to Contractor, showing adjustment to the Contract Sum that were not previously made into a Contract Modification.

1.10 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. 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.

1. Clean equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment operated during construction, clean ducts, blowers and coils of units operated without filters during construction.

2. Employ skilled workers for final cleaning.

C. Clean Site; mechanically sweep paved areas.

D. Remove waste and surplus materials, rubbish, and construction facilities from Site.

1.11 MATERIAL, EQUIPMENT AND FINISH DATA

A. Contractor shall submit two sets of data for primary materials, equipment and finishes as required under each specification section prior to final inspection, bound in 8-1/2" by 11" three-ring binders with durable plastic covers to Owner for Owner's records. In lieu of paper copies, Contractor may submit an electronic version of material data in PDF format.

1.12 MISCELLANEOUS PROJECT RECORD SUBMITTALS

A. Refer to other Specification Sections for miscellaneous record keeping requirements and submittals in connection with various construction activities. Immediately prior to Substantial Completion, complete miscellaneous records and place in good order, properly identified and bound or filed, ready for use and reference. Submit to Owner for Owner's records.

1.13 PROJECT GUARANTEE

A. Contractor shall guarantee Work done under Contract against failures, leaks or breaks or other unsatisfactory conditions due to defective equipment, materials or workmanship, and perform repair work or replacement required, at Contractor's sole expense, for period of one year from date of Final Acceptance.

B. Neither recordation of final acceptance nor final certificate for payment nor provision of the Contract nor partial or entire use or occupancy of premises by Owner shall constitute acceptance of Work not done in accordance with Contract Documents nor relieve Contractor of liability in respect to express warranties or responsibility for faulty materials or workmanship.

C. Owner may make repairs to defective Work as set forth in the General Conditions, if, within 5 working days after mailing of written notice of defective work to Contractor or authorized agent, Contractor shall neglect to make or undertake repair with due diligence; provided, however, that in case of leak or emergency where, in opinion of Owner, delay would cause

hazard to health or serious loss or damage, repairs may be made without notice being sent to Contractor, and Contractor shall pay cost thereof.

D. If, after installation, operation or use of materials or equipment to be furnished under Contract proves to be unsatisfactory to Owner, Owner shall have right to operate and use materials or equipment until it can, without damage to Owner, be taken out of service for correction or replacement. Period of use of defective materials or equipment pending correction or replacement shall in no way decrease guarantee period required for acceptable corrected or replaced items of materials or equipment.

E. Nothing in this Section shall be construed to limit, relieve or release Contractor's, subcontractors' and equipment suppliers' liability to Owner for damages sustained as result of latent defects in equipment caused by negligence of suppliers' agents, employees or subcontractors. Stated in another manner, warranty contained in the Contract Documents shall not amount to, nor shall it be deemed to be, waiver by Owner of any rights or remedies (or time limits in which to enforce such rights or remedies) it may have for defective workmanship or defective materials under laws of this State pertaining to acts of negligence.

1.14 WARRANTIES

A. Execute Contractor's submittals and assemble warranty documents, and operations and maintenance manuals, executed or supplied by subcontractors, suppliers, and manufacturers.

1. Provide table of contents and assemble in 8-1/2" by 11" three-ring binder with durable plastic cover, appropriately separated and organized.

2. Assemble in Specification Section order.

B. The Contractor shall not be held responsible for defects due to misuse, negligence, willful damage, improper maintenance or accident caused by Others, or for defective parts whose replacement is necessitated by failure of Owner's maintenance forces to properly clean and service them, provided the Contractor has furnished complete maintenance instructions and appropriate instruction to the Owner.

C. Submit material prior to final application for payment.

1. For equipment put into use with Owner's permission during construction, submit within ten (10) working days after first operation.

2. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten (10) working days after acceptance, listing date of acceptance as start of warranty period.

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

E. Limitations: Warranties are not intended to cover failures that result from the following:

1. Unusual or abnormal phenomena of the elements

2. Vandalism after substantial completion

3. Insurrection or acts of aggression including war

F. Related Damages and Losses: Remove and replace Work which is damaged as result of defective Work, or which must be removed and replaced to provide access for correction of warranted Work.

G. Warranty Reinstatement: After correction of warranted Work, reinstate warranty for corrected Work to date of original warranty expiration or to a date not less than 365 days after corrected Work was done, whichever is later.

H. Replacement Cost: Replace or restore failing warranted items without regard to anticipated useful service lives.

I. Warranty Forms: Submit drafts to Owner for approval prior to execution. Forms shall not detract from or confuse requirements or interpretations of Contract Documents.

1. Warranty shall be countersigned by manufacturers.

2. Where specified, warranty shall be countersigned by subcontractors and installers.

J. Rejection of Warranties: Owner reserves right to reject unsolicited and coincidental product warranties that detract from or confuse requirements or interpretations of Contract Documents.

K. Term of Warranties: For materials, equipment, systems and workmanship warranty period shall be one (1) year minimum from date of final completion of entire Work except where:

1. Detailed specifications for certain materials, equipment or systems require longer warranty periods.

2. Materials, equipment or systems are put into beneficial use of Owner prior to Final Completion as agreed to in writing by Owner.

L. Warranty of Title: No material, supplies, or equipment for Work under Contract shall be purchased subject to any chattel mortgage, security agreement, or under a conditional sale or other agreement by which an interest therein or any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all work to deliver premises, together with improvements and appurtenances constructed or placed thereon by Contractor, to Owner free from any claim, liens, security interest, or charges, and further agrees that neither Contractor nor any person, firm, or corporation furnishing any materials or labor for any Work covered by Contract shall have right to lien upon premises or improvement or appurtenances thereon. Nothing contained in this Paragraph, however, shall defeat or impair right of persons furnishing materials or labor under bond given by Contractor for their protection or any rights under law permitting persons to look to funds due Contractor in hands of Owner.

1.15 SERVICE AND MAINTENANCE CONTRACTS

A. Compile, review, and submit specified service and maintenance contracts as specified for warranties and bonds.

1.16 PREPARATION FOR FINAL INSPECTION

A. Perform final cleaning as specified in Section 01 74 13.

B. Assemble warranties, service and maintenance contracts, operating and maintenance instructions, and other items as specified, and submit to the Architect.

C. Remove temporary tapes, wrapping, coatings, paper labels, and other similar items. Dust, mop, wash, or wipe exposed and semi-exposed surfaces.

D. At the Contractor's request, the Architect will attend a pre-final detailed Project review, to allow the Contractor to gather the majority of punch list items while the subcontractors are still on the Project. Provide a typewritten list of all items remaining to be completed or corrected; list by room number and item number. Segregate plumbing, HVAC, and electrical on separate lists.

If the Owner requires that the Architect perform, assemble or assist in creating the pre-final project list in order to move the Project to completion, the Architect shall be compensated for all associated costs which will be deducted from the progress payment due the Contractor. Any associated costs resulting from the additional work will be processed as a Deductive Change Order in accordance with the General Conditions.

If the Architect or Owner determines that the list is inadequate, non-descriptive or incomplete based on the review, the Architect shall generate the list. The Architect shall be compensated fall all associated costs which will be deducted from the progress payment due the Contractor.
Any associated costs resulting from the additional work will be processed as a Deductive Change Order in accordance with the General Conditions.

E. At the Contractor's request, the Architect will make a final Project review when the items in the pre-final punch list have been completed and after final cleanup, operation tests and the like have been performed.

F. When the Architect determines that the Project is substantially complete and that final punch list items are completed, a final Project Inspection Report shall be executed.

G. Upon execution of the Final Project Inspection Report, record and pay for Notice of Completion and furnish copies to the Owner and the Architect.

1.17 RESTORATION OF DAMAGED WORK

A. Restore or replace damaged materials and finishes caused by movement of equipment or other operations of the Contractor or as specified or directed by the Architect, at no additional cost to the Owner.

B. Restoration shall be equal to the original work, and finishes shall match the appearance of existing adjacent work.

1.18 REMEDIAL WORK

A. Replace work due to faulty workmanship or materials at no additional Cost to the Owner.

B. Coordinate work with the Owner and perform at such time and manner to cause minimal interruption and inconvenience to the Owner's operations.

1.19 EXTRA MATERIALS

A. Where specified, provide extra materials in the quantities and manner specified.

B. Store these materials as directed by the Owner.

C. Delivery and certification of extra materials shall be prerequisite to Substantial Completion.

1.20 TURN-IN

A. Contract Documents will not be closed out and final payment will not be made until all personnel Identification Media, vehicle permits and keys issued to Contractor during prosecution of Work are turned in to Owner.

1.21 RELEASE OF CLAIMS

A. Contract Documents will not be closed out and final payment will not be made until a Release of Any and All Claims, is completed and executed by Contractor and Owner.

1.22 FIRE INSPECTION COORDINATION

A. Contractor shall coordinate fire inspection and secure sufficient notice to Owner to permit convenient scheduling.

1.23 BUILDING INSPECTION COORDINATION

A. Contractor shall coordinate with Owner's and Building inspectors a final inspection for the purpose of obtaining final approval an occupancy certificate.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

NOT USED

END OF SECTION

DIVISION 2

EXISTING CONDITIONS

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SECTION 02 41 19

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, store in a secure location, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at project site with demolition subcontractor.

1.4 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.5 FIELD CONDITIONS

A. Owner will utilize portions of building during selective demolition. Conduct selective demolition so Owner's operations will not be disrupted.

B. Hazardous Materials: Hazardous materials are present in buildings and structures to be selectively demolished. General Contractor to coordinate demolition activities with hazardous material abatement.

C. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities to be disconnected have been disconnected and capped before starting selective demolition operations.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly report to design team lead.

D. Survey of Existing Conditions: Compare existing conditions in field with those indicated on drawings. Report any discrepancies to design team lead.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Arrange to shut off indicated utilities with Owner's representative.
   2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
   3. Disconnect, demolish, and remove components indicated to be removed.
      a. Equipment to Be Removed: Disconnect and cap services and remove equipment.
      b. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
      c. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

   1. Comply with requirements for access and protection specified in Section 01 50 00 "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
5. Dispose of demolished items and materials promptly.

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

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DIVISION 3

CONCRETE

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SECTION 03 10 00

CONCRETE FORMWORK

1 GENERAL

1. RELATED DOCUMENTS

a. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

2. SUMMARY

a. Section includes formwork, shoring, reshoring, backshoring, falsework, bracing, and other temporary supports required to form and support all cast-in-place concrete shown on the drawings.

b. Related Requirements:

1) Specification 03 20 00 “Concrete Reinforcing” for reinforcement associated with cast-in-place concrete.
2) pecification 03 30 00 “Cast-in-Place Concrete” for cast-in-place concrete and related products.

3. REFERENCES

a. Definitions:

1) Backshores: Shores placed snugly under a stripped concrete structural member after the original formwork and shores have been removed from a small area <u>without</u> allowing the structural member to deflect or support its own weight or superimposed construction loads. It is assumed that backshores carry the same load as that carried by the original shores they replace.
2) Formwork: The total system of support for freshly placed concrete, including the mold or sheathing that contacts the concrete and all supporting members, hardware, and necessary bracing.
3) Professional Engineer: A professional engineer who is licensed to practice engineering in the state where the project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for projects with concrete formwork that are similar to that indicated for this Project in material.
4) Reshores: Shores placed snugly under a stripped concrete structural member <u>after</u> the original forms and shores have been removed from the member, thus requiring the member to carry its own weight and superimposed construction loads at the time of installation. Reshores are assumed to carry no load at the time of installation. After the installation of reshores, superimposed construction loads are assumed to be distributed among all members connected by reshores.
5) Shores: Vertical or inclined support members designed to carry the weight of formwork, concrete, and construction loads above.

b. Reference Standards:

1) Comply with the provision of the following codes, specifications, and standards except where more stringent requirements are shown or specified:

a) ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
b) ACI 301, "Specifications for Structural Concrete for Buildings."
c) ACI 318, "Building Code Requirements for Structural Concrete."
d) ACI 347, “Guide to Formwork for Concrete”
e) CRSI, "Manual of Standard Practice."

4. RESPONSIBILITY

a. The design, construction, and safety of all formwork shall be the responsibility of the Contractor. All forms, shores, reshores, backshores, falsework, bracing, and other temporary supports shall be engineered to support all loads imposed including the wet weight of concrete, construction equipment, live loads, lateral loads due to wind and wet concrete imbalance. The Contractor shall also be responsible for determining when temporary supports, shores, reshores, backshores, and other bracing may be safely removed.

5. SUBMITTALS

a. None required.

6. QUALITY ASSURANCE

a. Qualifications:

1) Licensed Professionals: The formwork design engineer retained by the Contractor shall be a professional engineer registered in the state where the project is located and shall be experienced in the design of concrete formwork.

2 PRODUCTS

1. FORM-FACING MATERIALS

a. Smooth-Formed Finished Concrete: Unless otherwise specified, formwork for exposed concrete surfaces as defined by the Surface Finish Class noted on the drawings, shall consist of plywood, metal, metal framed plywood, or other acceptable surface. Formwork shall provide a continuous straight and smooth surface conforming to the joint system as specified on the Architect's drawings. Form material shall have sufficient thickness to withstand pressure of concrete without bow or deflection. Plywood shall be exterior grade plywood panels, suitable for concrete forms, complying with U.S. Product Standard PS-1, each piece bearing a legible inspection trademark, and as follows:

1) High Density Overlay (100/30 min. rating) on Hardwood Face, Class 1or better.
2) High Density Overlay (100/30 min. rating) on Softwood Face, Class 1 or better.
3) Medium Density Overlay on Hardwood Face, Class 1 or better, mill-release agent treated and edge sealed.

4) Medium Density Overlay on Softwood Face, Class 1 or better, mill-release agent treated and edge sealed.

b. Non-specific formed concrete: Unless otherwise specified, the default finish for formed surfaces shall be rough-form finish constructed with plywood, lumber, metal, or other acceptable material. Lumber shall be dressed on at least two edges and one side for tight fit. The minimum grade shall be B-C, exterior grade.

2. CYLINDRICAL COLUMNS AND SUPPORTS

a. Round section members shall be formed with metal, fiberglass, reinforced plastic, paper, or fiber tubes, unless otherwise specified. Paper or fiber tubes shall be constructed of laminated plies using water-resistant adhesive with wax impregnated exterior for weather and moisture protection. Units shall have sufficient wall thickness to resist loads imposed by wet concrete without detrimental deformation.

3. FORMWORK COATINGS

a. Formwork coatings shall be of a commercial formulation that will not bond with, stain, nor adversely affect concrete surfaces or impair subsequent treatment of concrete surfaces requiring bond or adhesion, nor impede curing with water or curing compounds. Provide a product that has a maximum VOC (Volatile Organic Compounds) of 50 g/l but not greater than that permitted by the local government agency having jurisdiction in the area where the project is located.

b. Products: Subject to compliance with requirements, provide one of the following:

1) Dayton Superior; Bio-Release EF.
2) Unitex; Farm Fresh.
3) Universal Form Clamp; Bio-Form.
4) US Spec; Aqua Blue.

4. NAILS AND FASTENERS

a. Use only galvanized nails and fasteners for securing formwork in structures exposed to weather or unconditioned spaces such as garages, canopies, and porte-cocheres.

5. FORM TIES

a. Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to minimize spalling of concrete on removal.

1) Exposed Surfaces: Furnish units that will leave no portion of the tie closer than 3/4 inch to the plane of the concrete surface and that will leave holes not larger than one inch in diameter in concrete surface when the ends or end-fasteners have been removed.
2) Dampproofed Surfaces: Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.
3) Exposed to Weather or Unconditioned Space: Provide removable, glass-fiber-reinforced plastic, stainless steel, or galvanized form ties that will leave no corrodible metal closer than

1 1/2 inches in surfaces that will be exposed to weather or in an unconditioned space in the final structure. The ties shall leave holes no larger than one inch in diameter in concrete surfaces when the ends or end-fasteners are removed.

6. CHAMFER STRIPS

a. Provide wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

3 EXECUTION

1. EARTH FORMS

a. Excavations for earth forms shall be accurately and neatly cut.

b. Excavations shall be sufficient to permit placement, inspection and removal of forms.

2. FABRICATION AND CONSTRUCTION

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

1) The formwork design engineer shall design the concrete formwork, formwork removal, shoring, reshoring, and backshoring.

b. Construct forms to sizes, shapes, lines, and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Maintain formwork construction tolerances in compliance with ACI 347. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages, inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of concrete mortar.

c. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

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

e. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and patch forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

f. Chamfer exposed corners and edges as indicated, using specified chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

g. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.

3. CLEANING AND TIGHTENING

a. Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and all other debris just prior to concrete placement. Retighten forms and bracing prior to concrete placement as required to prevent concrete mortar leaks and maintain proper alignment.

4. CLEANING AND RE-USE OF FORMS

a. Forms reused in the work shall be repaired and cleaned. Split, frayed, delaminated, or otherwise damaged facing material will not be acceptable for exposed surfaces. Forms intended for successive concrete placement shall have surfaces cleaned, fins and laitance removed, and joints tightened to avoid surface offsets. New form coating compound shall be applied to reused forms. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

5. TOLERANCES

a. Unless specified otherwise, all tolerances for concrete formwork shall conform to ACI Standard 117, "Standard Tolerances for Concrete Construction and Materials". Before concrete placement the Contractor shall check lines and levels of erected formwork and make any corrections and adjustments as required to ensure proper size and location of concrete members and stability of forming systems. During concrete placement the Contractor shall check formwork and supports to ensure that forms have not displaced and that completed work will be within specified tolerances.

b. Construct forms so as to limit the offset between adjacent pieces of formwork facing material in accordance with the surface tolerance class as defined in ACI 117 corresponding to the Surface Finish Class noted on the drawings. The offset limits shall apply to both abrupt and gradual variations in the surface.

c. Prior to each concrete pour, the Contractor shall engage a qualified surveyor to verify that work is within specified tolerances. The surveyor shall report in writing to the Architect, Engineer and Contractor certifying that the work is acceptable or indicating any deviations from allowable tolerances.

d. The Owner shall hire an independent qualified surveyor to verify the proper form, line, position, and elevation of the finished concrete work. The results of each survey shall be sent to the Owner, Architect/Engineer, and Contractor and shall identify any deviation from specified tolerances. All work not in conformance with specified tolerances shall be removed at the Contractor's sole expense if so specified by the Owner.

6. SHORES AND SUPPORTS

a. Comply with requirements of ACI 301 for shoring, reshoring and backshoring in concrete construction and as herein specified where more stringent.

b. Design: Shores and reshores or backshores must be designed to carry all loads transmitted to them. A rational analysis should be used to determine the number of floors to be shored, reshored, or backshored, and to determine the loads transmitted to the floors, shores and reshores or backshores as a result of the construction sequence.

7. REMOVAL OF FORMS AND SUPPORTS

a. Determination by Contractor's Registered Engineer: The Contractor's registered professional engineer shall determine and submit for Owner's record the time and sequence of formwork and shore removal subject to the criteria as specified below. The submittal shall clearly distinguish between reshoring and backshoring procedures.

b. Determining in situ Strength of Concrete: The General Contractor shall be responsible for making and curing concrete cylinders, cured under field conditions, for the purpose of determining concrete strength at time of form and shore removal. Such cylinders shall be made by the Contractor and tested by his testing laboratory. Alternatively, the in situ strength of concrete may be determined by the Maturity Method following the requirements of ASTM C 1074.

c. Records of Weather Conditions: The Contractor shall be responsible for keeping records of weather conditions to be used in the decision on when to remove forms.

d. Formwork Not Supporting Concrete: Formwork not supporting concrete, such as sides of beams, walls, columns and similar parts of the structure, may be removed after cumulatively (not necessarily consecutively) curing at not less than 50°F for 12 hours after placing concrete, provided the concrete is sufficiently hard so as not to be damaged by form removal operations and provided curing and protection operations are maintained. If ambient air temperatures remain below 50°F, if retarding agents are used, or if Type II and Type V Portland cement is used, then this specified minimum period shall be increased as required to safely remove the forms without damage to the concrete. Where such forms also support formwork for slab or beam soffits, the removal times of the latter shall govern.

e. Formwork Supporting Weight of Concrete: Formwork supporting weight of concrete such as beam soffits, joists, slabs and other structural elements shall not be removed until concrete has attained at least 70% of the design compressive strength, but not less than 2,800 psi.

8. FIELD QUALITY CONTROL

a. Contractor shall inspect formwork to verify that conditions meet ACI 347 and the requirements of the construction documents

b. Field Inspection. The following tests shall be completed by the Testing Laboratory:

1) Shallow Foundation Elements:

a) Verify element width, length, depth, and elevation.

b) Verify that forms are plumb and straight, braced against movement, and lubricated for removal.

2) Slabs-on-Grade:

a) Verify formwork at turndowns and slab edges is plumb and straight, braced against movement and lubricated for removal.

3) Columns and Walls:

a) Verify that forms are plumb and straight, braced against movement, and lubricated for removal.
b) Verify proper dimensions and orientation.
c) Verify top of column or wall elevation is set in form and that it is 1/2 inch below the future slab soffit.

4) In-Situ Concrete Strength Verification Prior to Form Stripping: The Testing Laboratory shall verify that the concrete has reached the required minimum strength before form removal by evaluating the specified tests. Refer to Specification 03 30 00 "Cast-in-Place Concrete" for additional information regarding the tests.

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SECTION 03 20 00

CONCRETE REINFORCEMENT

1 GENERAL

1. RELATED DOCUMENTS

a. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

2. SUMMARY

a. Section includes labor, materials, hardware, equipment, transportation and services required to fabricate and place all reinforcement for cast-in-place concrete including bars, welded wire reinforcement, ties and supports shown on the drawings and as specified.

b. Related Requirements:
   1) Specification 03 10 00 “Concrete Forming and Accessories” for forming associated with cast-in-place concrete.
   2) Specification 03 30 00 “Cast-in-Place Concrete” for cast-in-place concrete and related products.

3. PRICE AND PAYMENT PROCEDURES

a. Alternates:

   1) Products Requiring Third Party Evaluation Service Reports: For those products listed in Part 2 as requiring Evaluation Service Reports (ESR), alternate products that do not have ESR will be considered by the Engineer only if a valid research report or test data from an independent and approved agency is provided and use of the product receives prior approval from the Building Official.

4. REFERENCES

a. Reference Standards:

   1) Comply with all provisions of the following codes, specifications, and standards except where more stringent requirements are shown or specified:

      a) ACI 117, “Specifications for Tolerances for Concrete Construction and Materials."
      b) ACI 301, "Specifications for Structural Concrete for Buildings."
      c) ANSI/AWS D1.4, “Structural Welding Code – Reinforcing Steel.”
      d) CRSI, "Manual of Standard Practice."

5. ADMINISTRATIVE REQUIREMENTS

a. Coordination:

1) Quality Control: The Contractor is responsible for quality control, including workmanship and materials furnished by subcontractors and suppliers.
2) Document Conflict and Precedence: In case of conflict among documents, including architectural and structural drawings and specifications, notify the Architect/Engineer prior to submitting proposal. In case of conflict between and/or among the structural drawings and specifications, the strictest interpretation shall govern, unless specified otherwise in writing by the Architect/Engineer.

6. SUBMITTALS

a. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and items including mechanical splices, hooked anchorage systems, large-headed stud punching shear reinforcement, dowel bar replacement systems, and dowel bar sleeves.

b. Shop Drawings:

1) Submit shop drawings for all reinforcing steel and related accessories for the Engineer's approval. Shop drawings shall show arrangement and layout, bending and assembly diagrams, bar schedules, stirrup spacing, splicing and laps of bars and shall be prepared in accordance with CRSI Standards.
2) Submit shop drawings indicating which members will use fusion welding process for assembly. Shop drawings shall show complete structural details indicating the size of stirrups, the size of holding wires, and welding requirements.

c. Certificates: Submit, for record, mill certificates and/or test results signed by Producer, for all reinforcement

d. Test and Evaluation Reports:

1) Submit International Code Council (ICC) Evaluation Service Reports indicating approval from ICC Evaluation Service, Inc. for mechanical splices, hooked anchorage systems, large-headed stud punching shear reinforcement and dowel bar replacement systems.
2) Submit test results for deformed bar material not identifiable as outlined in Part 2 below.

e. Special Procedure Submittals: Submit shop welding program for fusion welding including the type of the specific fusion welding machine and the quality control/inspection protocol for the shop welding.

f. Qualification Statements: Submit welding certificates.

7. QUALITY ASSURANCE

a. Testing Laboratory Requirements: The Owner's Testing Laboratory shall:

1) Review the Welding Procedure Specification (WPS) submitted by the Contractor for any reinforcing steel other than ASTM A 706 that is proposed to be welded for consistency with acceptable welding practices and AWS.
2) Review the welder qualifications by certification or verify by retesting and shall obtain the welder certificates.

b. Welder Qualifications: Qualify procedures and personnel according to ANSI/AWS D1.4.

2 PRODUCTS

1. MATERIALS

a. Steel Reinforcement:

1) Reinforcing materials shall be delivered from the mill in bundles that are identified as to heat number and manufacturer and accompanied with mill and analysis test reports and an affidavit from the supplier stating that the material conforms to the requirements of the governing ASTM specification listed herein.
2) Deformed bar material that is not identifiable according to the criteria listed above shall be tested for tensile strength and bend tests according to ASTM A615 on a sample of two bars for each ten tons or fraction thereof of unidentified material for each bar size. The bars shall be a minimum of 24 inches long. Bend tests are not required for #14 and #18 bars. Submit the results of such tests for record.
3) Reinforcing Bars: Reinforcing bars shall conform to ASTM A615, Grade 60.
4) Reinforcing Steel: Reinforcing steel used as transverse reinforcing or as spiral reinforcing as noted on the drawings shall conform to ASTM A1035.
5) Weldable Reinforcing Bars: All reinforcing bars to be welded, as noted on the drawings, shall conform to ASTM A 706.
6) Deformed Bar Anchors: AWS Type D studs manufactured in conformance with ASTM A496 with a minimum tensile strength of 80,000 PSI. ASTM A 615 reinforcing bars may not be substituted for deformed bar anchors. Reinforcement shall be approved by the ICC-Evaluation Service, Inc and shall have the Evaluation Service Report submitted for Engineer review. The following are acceptable products, provided that their Evaluation Service Reports are still valid at the time of intended use on the project:

   a) Nelson Stud Welding, Inc.; Nelson D2L Deformed Bar Anchor Studs (ESR-2907).
   b) Tru-Weld Division, TFP Corporation; Deformed Bar Anchors (ESR-2823).

7) Galvanized Reinforcing Steel: Provide galvanized reinforcing bars at the locations indicated on the drawings. Galvanized reinforcing bars shall conform to ASTM A767 Class II (2.0 ounces zinc per square foot), hot dipped galvanized after fabrication and bending. Bars that are to be galvanized shall conform to the type of steel required for the given situation as noted on the drawings.
8) Epoxy-Coated Reinforcing Steel: Provide epoxy coated reinforcing bars at the locations indicated on the drawings. Epoxy coated reinforcing bars shall conform to ASTM A775. Bars that are to be epoxy coated shall conform to the type of steel required for the given situation as noted on the drawings.
9) Plain Steel Welded Wire Reinforcement: ASTM A185 with a yield strength of 65,000 PSI. Provide in flat sheets only.
10) Wire: Smooth wire for spiral reinforcement shall conform to ASTM A82 with a minimum yield strength of 70,000 PSI.

11) Epoxy-Coated Plain-Steel Wire: ASTM A884, Class A, plain-steel wire.

2. SPLICES

a. Mechanical Splices:

1) Mechanical splices shall conform to Type 1 or Type 2 as indicated on the drawings:

a) Type 1 splice shall develop, in tension and compression, 1.25 times the specified yield strength of the splice bar.
b) Type 2 splice shall meet the requirements of Type 1 splice and, in addition, develop the full tensile strength of the splice bar.

2) Splices shall be approved by a Third Party Evaluation Service and shall have the Evaluation Service Report submitted for Engineer review.
3) The bar ends that are to attach to the splice shall be prepared and installed in accordance with the manufacturer's requirements.
4) The following are acceptable mechanical tension splices provided that their Evaluation Service Reports are still valid at the time of intended use on the project:

a) BarSplice Products, Inc.; BPI-Grip XL System (ESR-2299). (Type 1 or Type 2)
b) BarSplice Products, Inc.; Taper Threaded Grip-Twist System (ESR-2299). (Type 1 or Type 2)
c) BarSplice Products, Inc.; Position Taper Threaded Grip-Twist System (ESR-2299). (Type 1 or Type 2)
d) Headed Reinforcement Corporation; HRC 500/510 Xtender Mechanical Coupler System (ESR-2764). (Type 1 or Type 2)
e) Dayton Superior Corporation; DBDI Reinforcing Bar Mechanical Splice System (ESR-2649). (Type 1 or Type 2).
f) Erico Products, Inc.; Lenton Coupler (ER-3967). (Type 1 or Type 2) (for grade 75 bars #9 and larger, use only Standard Coupler).
g) Splice Sleeve North America; NMB Splice-Sleeve (ER-5645). (Type 1 or Type 2).

b. Dowel Bar Replacement: All grade 60 reinforcing steel dowel bars shown on the drawings crossing concrete construction joint surfaces with inserts cast flush against the form and having reinforcing bars connected to the insert in a subsequent concrete pour shall conform to the following:

1) Splice connection to the insert shall develop the 1.25 times the specified yield strength and the full tensile strength of the spliced bar.
2) Splices shall be approved by a Third Party Evaluation Service as expressed in an Evaluation Service Report, which shall be submitted for review.
3) The following are acceptable products, provided that their Evaluation Service Reports are still valid at the time of intended use on the project:

a) Dextra Manufacturing Co., Ltd.; Bartec Mechanical Splice System for Steel Reinforcing Bars in Concrete (ESR-1705).
b) Erico Products, Inc.; Lenton Form Saver (ER-3967).

c. Hooked Anchorage Replacement: Reinforcing bar terminations shall be manufactured out of ASTM A576, ASTM A615, or A706 material and shall develop the full tensile strength of the bar when installed at the manufacturer's recommended depth.

1) The anchorage shall be approved by a Third Party Evaluation Service as expressed in an ICC Evaluation Service Report, which shall be submitted for review.
2) The following are acceptable products, provided that their Evaluation Service Reports are still valid at the time of intended use on the project:

   a) Dextra Manufacturing Co., Ltd; Bartec Mechanical Anchorages for Steel Reinforcing Bars in Concrete (ESR-2166).
   b) Headed Reinforcement Corporation; HRC 555 Headed Reinforcing Bars (ESR-2935).
   c) Erico Products, Inc.; Lenton Terminator (ER-3967).

3. REINFORCEMENT ACCESSORIES

a. Joint Dowel Bars: Smooth bars used to dowel across slab-on-grade construction joints shall conform to ASTM A615, Grade 40 or ASTM A36, plain-steel bars. Cut bars true to length with ends square and free of burrs.

b. Epoxy-Coated Joint Dowel Bars: Smooth epoxy-coated bars used to dowel across slab-on-grade construction joints shall conform to ASTM A775 with ASTM A615, Grade 40 or ASTM A36 plain-steel bars. Cut bars true to length with ends square and free of burrs.

c. Dowel Bar Sleeves: Plastic or gage metal (26 gauge minimum) sleeves with an inside diameter of 1/16 inch greater than the dowel bar that it encases, that have the strength, durability, and design to provide free movement of the dowel relative to the concrete slab and that are specifically manufactured for this purpose.

d. Alternate Slab-on-Grade Joint Load Transfer Systems: A system that consists of flat, ASTM A 36 plate that is saw cut into a square or rectangular shape and is embedded into or encased by a plastic sleeve that allows movement in both lateral directions but not in the vertical direction. Acceptable systems are manufactured by PNA Construction Technologies with products known by the names “Diamond Dowel System” and “PD^3 Basket” and Greenstreak Group Inc. with products known as “Speed Plate’ and “Double-Tapered Basket”.

e. Tie Wire: Tie wire shall be annealed steel tie wire, minimum 16 gauge.

   a) Tie wire in architecturally exposed concrete shall be plastic coated or stainless steel.
   b) Tie wire for epoxy-coated reinforcement shall be epoxy-coated.
   c) Tie wire for galvanized reinforcement shall be galvanized.

f. Holding Wire: Holding wire shall conform to ASTM A82 or ASTM A496.

g. Coating Repair Materials: Repair damaged areas of epoxy-coated or galvanized reinforcement using the following products.

   1) Epoxy Repair Coating: Liquid, two-part, epoxy repair coating compatible with epoxy coating on reinforcement and complying with ASTM A775.
   2) Zinc Repair Material: ASTM A780, zinc-based solder, paint containing zinc dust, or sprayed zinc shall be used to repair damaged areas of galvanized reinforcement.

h. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Use wire bar type supports complying with CRSI recommendations.

1) Slabs-on-Grade: Use precast concrete bar supports (dobies) or supports with sand plates or horizontal runners designed for use on ground.
2) Shallow Footing Bottom Reinforcement: Use precast concrete bar supports (dobies) or chairs designed for soil-supported slabs.
3) Mat Foundation: Use precast concrete bar supports (dobies), chairs designed for soil-supported slabs, or cast-in-place concrete curbs.
4) Exposed to View Concrete: Provide supports with legs which are plastic protected (CRSI, Class 1) or stainless steel protected (CRSI, Class 2).
5) Support of Epoxy-Coated Reinforcement: Provide epoxy-coated or other dielectric-polymer-coated wire bar supports to support epoxy-coated reinforcement.
6) Support of Galvanized Reinforcement: Provide galvanized wire bar supports to support galvanized reinforcement.

3 EXECUTION

1. FABRICATION AND DELIVERY

a. Bending and Forming: Fabricate bars of indicated sizes and accurately form to shapes and lengths indicated and required, by methods not injurious to materials. Do not heat reinforcement for bending. Bars shall be free from injurious defects, have a workman-like finish with no excessive rust and/or pitting, and have no unusual kinks or bends.

b. Marking and Shipping: Bundle reinforcement and tag in accordance with Section 7.4.5 of the CRSI “Manual of Standard Practice.” Transport and store at site so as not to damage material. Keep sufficient supply of tested, approved, and proper reinforcement at the site to avoid delays. Maintain reinforcing bars free of mud, dirt, grease, or other coating.

c. Repair of Epoxy-Coated Reinforcing: Repair cut and damaged epoxy coatings on fabricated reinforcing before delivery with epoxy repair coating according to ASTM D 3963

2. PLACING REINFORCEMENT

a. Comply with CRSI recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports and as herein specified.

b. Before placing reinforcement and again before concrete is placed, clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

c. Accurately position, support, and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by chairs, runners, bolsters, spacers, and hangers as required. Exercise particular care to maintain proper distance and clearance between parallel bars and between bars and forms. Provide spreaders and spacers to hold steel in position. Support steel at proper height upon approved chairs.

d. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set tie wires so ends are directed into concrete, not toward exposed concrete surfaces.

e. Support of Spread Footing or Mat Foundation Reinforcing Steel:

1) Bottom Steel: Support bottom reinforcing mat to provide the specified clearance to the bars. Spacing between supports shall not exceed 4'-0" centers each way.
2) Top Steel: Support top reinforcing on steel angle frames braced in both directions or on special standee support bars. Spacing between supports shall not exceed 4'-0" centers each way. The depth of the supports shall provide the specified clearance from the bars to the top of the concrete. The design of the support steel shall be the responsibility of the Contractor.

f. Install welded wire reinforcement in as long lengths as practicable. Provide lap splice for wires of adjoining pieces per ACI 318 Chapter 12.18.1 or 12.19.1 and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

g. Coordinate with other trades and expedite materials and labor to avoid omissions and delay.

h. Install waterproof membrane or vapor retarder as specified prior to placing steel for concrete slabs-on-grade.

i. Extend reinforcement continuous through construction joints unless otherwise shown on the drawings.

j. Slab-on-Grade Joint Dowel Bars: Support slab-on-grade joint dowel bars independently of support for slab reinforcement on soil supported slab bolsters or specially manufactured cradles such that dowel bar remains parallel to slab surface and at right angles to joint during concreting operations. Lightly coat the exposed end of the dowel with a paraffin-base lubricant, asphalt emulsion, form oil, or grease or use a dowel bar sleeve.

k. Alternate Slab-on-Grade Joint Load Transfer Systems: Install the alternate load transfer system in accordance with the manufacturer's instructions such that the largest plane of the flat plate is parallel to the plane of the subgrade on which the slab is bearing.

l. Provide and place additional reinforcing steel at all sleeves and openings in beams, slabs, and walls as specified on the drawings. Where sleeves or openings not shown on the drawings interrupt the reinforcement, consult with Engineer for instructions for placing and splicing of bars. Provide required additional reinforcing steel at no additional cost to the Owner.

m. Epoxy-Coated Reinforcement: Use epoxy-coated steel tie wires to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D3963.

n. Galvanized Reinforcement: Use galvanized steel tie wires to fasten galvanized reinforcement. Repair cut and damaged zinc coatings with zinc repair material.

o. Do not bend reinforcement that is embedded partially in concrete except in locations noted on the drawings or approved by the Engineer.

3. SPLICING REINFORCING STEEL

a. Provide splices as indicated on the drawings. Splice reinforcing bars only at locations shown on the structural drawings and approved shop drawings. Unauthorized or unscheduled splices not approved by the Engineer in writing will not be accepted.

b. All lap splices in reinforcing steel shall be contact lap splices unless detailed otherwise on the drawings.

c. Maintain proper cover and spacing between reinforcing bars at splices.

d. Lap unscheduled reinforcing bars not otherwise specified with a Class B lap splice. Lap welded wire reinforcement per ACI 318 Chapter 12.18.1 or 12.19.1.

e. Manufacturer of mechanical splice shall be present for first day's installation.

4. WELDING REINFORCING STEEL

a. Welding reinforcing steel is permitted only where specifically shown on the drawings. All welding shall conform to AWS D1.4. Only weldable reinforcing steel conforming to ASTM A706 or deformed bar anchors conforming to ASTM A496 shall be permitted. ASTM A615 bars may <u>not</u> be welded for structural use.

b. Tack welding of reinforcement shall not be permitted.

c. Fusion welding of preassembled cages shall be permitted only under the following conditions:

1) Written approval is received from the Building Official and the Engineer.
2) Fusion welding of holding wires to ties, stirrups, and hoops in beams, columns and grade beams to preassemble reinforcing cages is permissible. The holding wire area shall not exceed five percent of the beam, column, or grade beam cross sectional longitudinal steel area. Fusion welding is not allowed to longitudinal reinforcing steel in any beam, column, or grade beam.
3) Fusion welding of holding wires to the ends of the reinforcing steel placed in spread footings or mats is permitted if the fusion weld occurs within six bar diameters of the free end of the bar. Fusion welding is not allowed at the end of coupled, T-headed, or weld spliced bars.
4) Fusion welding of holding wires shall not occur on a bent portion of a reinforcing bar. Bars shall not be bent where a fusion weld occurs.

5. SHRINKAGE AND TEMPERATURE REINFORCEMENT

a. Provide shrinkage and temperature reinforcement as indicated on the drawings at right angles to main top and bottom bars for all structural slabs unless detailed otherwise on the drawings.

6. PLACEMENT OF WELDED WIRE REINFORCEMENT

a. Wherever welded wire reinforcement is specified as reinforcement in pan-formed beams or slabs, it shall be continuous and properly lapped per ACI 318 Chapter 12.18.1 or 12.19.1 across the entire concrete surface and not interrupted by beam or girders.

7. REINFORCEMENT IN COMPOSITE STEEL DECK SLAB

a. Composite steel deck slabs shall be reinforced as indicated on the drawings.

b. Placement of Slab Reinforcement: Provide bolsters, high chairs, and/or additional reinforcing as shown in details on the drawings to support the reinforcing with the clear cover shown on the drawings.

8. REINFORCEMENT IN GRADE BEAMS

a. Provide reinforcing in grade beams as shown on the drawings.

b. Bar Support for Grade Beam Cages: Grade beam bottom steel shall be supported at 5'-0" maximum centers using beam bolsters that provide bottom cover to the reinforcing steel as noted on the drawings. Beam bolsters used shall be designed and manufactured for support on soil.

9. REINFORCEMENT IN HOUSEKEEPING PADS

a. Provide welded smooth wire reinforcement 6 x 6 W2.9 x W2.9 minimum in all housekeeping pads supporting mechanical equipment unless detailed otherwise on the drawings.

10. REINFORCEMENT IN SIDEWALKS

a. Provide welded smooth wire reinforcement minimum 6 x 6 W1.4 x W1.4 in all sidewalks unless detailed otherwise on the Architectural, Civil, or Structural Drawings.

11. MECHANICAL AND PLUMBING REQUIREMENTS

a. Refer to Mechanical and Plumbing Drawings for concrete requiring reinforcing steel. Such reinforcement shall be furnished as part of the work of this section.

12. FIELD QUALITY CONTROL

a. Field Testing: The following tests shall be completed by the Testing Laboratory:

1) Mechanical Tension Splices: The Laboratory shall conduct monotonic tension tests in accordance with ASTM A1034 of mechanical splices of the type as specified on the structural drawings. It is not necessary that the specimens to be tested are production splices, however, the specimens to be tested shall have been made by the Contractor's personnel under field conditions. The rate of testing shall be as follows:

a) Two specimens for the first 50 splices (or fraction thereof) at the beginning of the job. Splices not meeting tension requirements shall be retested at Contractor's expense until all splices meet the tension requirements.
b) One specimen for every 100 (or fraction thereof) additional splices occurring on the job. Any splices not meeting tension requirements shall be retested at Contractors expense until all splices have passed the test.
c) A minimum of one test specimen shall also be selected from transition splices (splices of one bar size to another bar size), if any.

b. Field Inspection: The scope of the work to be performed by the inspector on the jobsite shall be as follows:

1) Reinforcing Steel: The Testing Laboratory or designated Special Inspector shall inspect 100% of reinforcement before each concrete pour to verify the information noted below. Inspection reports shall be prepared and distributed in accordance with the local building code and as specified in this specification.

a) Primary and secondary longitudinal reinforcement has correct size and number in proper layers.
b) Longitudinal reinforcement has correct length and lap.
c) Ties and stirrups are of correct size, spacing, and number and have the proper termination hook geometry.
d) Unscheduled face reinforcement in beams are provided and are of correct size, number and spacing and have the proper end terminations.
e) Proper hooks are provided at bar ends as detailed.
f) Reinforcement is properly supported and braced to formwork to prevent movement during concrete placement.
g) Reinforcement has proper cover.
h) Sufficient spacing between reinforcement for concrete placement.
i) Dowel reinforcement is of proper size, at proper spacing, and has proper lap length and embedment length.
j) Welded wire reinforcement is composed of flat sheets, has proper wire gage and spacing, is properly supported, and is properly lapped.
k) Proper construction/control/expansion joint spacing and reinforcement.
l) Reinforcement around embedded items is placed according to details.
m) Welded reinforcement has been done according to AWS requirements.
Mechanical Splices: The Testing Laboratory shall provide 100% visual inspection of mechanical tension splices on the project and consult with the manufacturer regarding recommendations for installation. Inspection shall verify compliance with specifications and conformance with the manufacturer's recommendations for installation after consulting with the manufacturer, who is to be present for the first installation of the splice on the project.
n) Welded Reinforcing: Visual inspection of all welded of reinforcing bars to ensure compliance with the requirements of AWS shall be done for the following items:

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

1 GENERAL

1. RELATED DOCUMENTS

a. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

2. SUMMARY

a. Section includes all labor, materials, services, equipment, and hardware required in conjunction with or related to the forming, delivery, and pouring of all cast-in-place concrete work. Concrete paving and walks are specified in Division 32.

b. Related Requirements:

1) Specification 03 10 00 “Concrete Forming” for forming associated with cast-in-place concrete.
2) Specification 03 20 00 “Concrete Reinforcing” for reinforcement for cast-in-place concrete.

3. REFERENCES

a. Reference Standards:

1) Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:

a) ACI 117, “Specifications for Tolerances for Concrete Construction and Materials.”
b) ACI 301, “Specifications for Structural Concrete for Buildings.”
c) ACI 305.1, “Specification for Hot Weather Concreting.”
d) ACI 318, “Building Code Requirements for Structural Concrete.”
e) CRSI, “Manual of Standard Practice.”

4. ADMINISTRATIVE REQUIREMENTS

a. Coordination:

1) Quality Control: The Contractor is responsible for quality control, including workmanship and materials furnished by subcontractors and suppliers.
2) Document Conflict and Precedence: In case of conflict among documents, including architectural and structural drawings and specifications, notify the Architect/Engineer prior to submitting proposal. In case of conflict between and/or among the structural drawings and specifications, the strictest interpretation shall govern, unless specified otherwise in writing by the Architect/Engineer.

3) Materials and installed work may require testing and retesting, as directed by the governing building code or the Architect/Engineer, at any time during progress of work.

a) The Contractor shall provide adequate notification to the Owner's Testing Agency of construction operations including the project schedule to allow the Testing Agency to schedule inspections. Failure to notify sufficiently may result in additional costs incurred by the Testing Laboratory that may be back-charged to the Contractor by the Owner.
b) The Contractor shall cooperate with laboratory personnel, provide access to the work, and provide access to manufacturer's operations.
c) The Contractor shall make adequate arrangement with the Owner's Testing Agency for inspection of material stockpiles and facilities.
d) The Contractor shall provide to the laboratory certificates and representative samples of materials proposed for use in the work in quantities sufficient for accurate testing as specified.
e) The Contractor shall furnish casual labor, equipment, and facilities as required for sampling and testing by the laboratory and otherwise facilitate the required inspections and tests.
f) Inspection or testing by the Owner does not relieve the Contractor of his responsibility to perform the Work in accordance with the Contract Documents. Tests not specifically indicated to be done at the Owner's expense, including retesting of rejected materials and installed work, shall be done at the Contractor's expense.

4) Responsibility for Selection and Use of Concrete Admixtures and Chemical Treatments: The Contractor shall be responsible for selecting admixtures and surface treatments that are compatible with the intended use of the concrete including all final surface treatments called for within this or other specifications or on the structural or architectural drawings. The Contractor is responsible for following the manufacturer's instructions for the use of their product including abiding by any limitations placed by the manufacturer on the use of any of its products.

b. Pre-Concrete Conference :

1) At least seven days prior to beginning concrete work, the Contractor shall conduct a meeting to review the proposed design mixtures and to discuss required methods and procedures to produce concrete construction of the required quality. Also, review requirements for submittals, status of coordinating work and availability of materials. Establish work progress schedule and procedures for materials inspection, testing, and certifications. The contractor shall send a pre-concrete conference agenda to all attendees seven days prior to the scheduled date of the conference.
2) The Contractor shall require responsible representatives of every party who is concerned with the concrete work to participate in the conference, either by phone or in attendance, including but not limited to the following:

a) Contractor's Superintendent.
b) Laboratory responsible for field quality control.
c) Concrete Subcontractor.
d) Owner's and Architect's/Engineer's Representative.

3) Minutes of the meeting shall be recorded, typed and printed by the Contractor and distributed by him to all parties concerned within five days of the meeting. One copy of the minutes shall be transmitted to the following for information purposes:

a) Owner's Representative.

b) Architect.
c) Engineer-of-Record.

c. Sequencing:

1) Provide for installation of inserts, hangers, metal ties, anchors, bolts, angle guards, dowels, thimbles, slots, nailing strips, blocking, grounds, and other fastening devices required for attachment of work. Properly locate in cooperation with other trades and secure in position before concrete is poured. Do not install sleeves in any concrete slabs, beams, or columns except where shown on the drawings or upon written approval of the Architect/Engineer.

5. SUBMITTALS

a. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including admixtures, patching compounds, epoxies, grouts, waterstops, joint systems, curing compounds, dry-shake finish materials, hardeners, sealers, joint fillers, and others as requested by Architect/Engineer.

b. Shop Drawings:

1) Construction Joints: Submit drawings of proposed construction joint locations in concrete for slab-on-grade, mat foundations, structural floors, roofs and walls. Submit any additional or changed reinforcing that is required at construction joints that differs from that shown on the drawings.
2) Openings, Sleeves, and Cores: Submit drawings of all openings to be formed, sleeved, cored, or sawcut in cast-in-place elements. Drawings shall indicate size and location of openings, sleeves, or cores.
3) Embedded Items: Submit drawings showing all items to be embedded in concrete elements, including plates, angles, bolts, and any non-structural items, such as conduit. Drawings shall indicate location, size, orientation, and type of embedded item.
4) Anchor Rods: Submit drawings showing layout and details for steel templates used for placing anchor rods.

c. Certificates:

1) Material and Mill Certificates:

a) Provide material and mill certificates as specified herein and in the Testing Laboratory section of the Specifications. The Manufacturer and Contractor shall sign the material and mill certificates certifying that each material item complies with specified requirements.
b) Provide certification from admixture manufacturers that chloride ion content complies with specified requirements.

d. Design Mixtures: Submit for each concrete mixture in accordance with the requirements specified in part 2.

e. Field Quality Control Submittals:

1) Surveys: Submit report certifying that all anchor rods and reinforcing dowels into columns above are in their proper location prior to placing of concrete.

f. Qualification Statements: Submit certifications for adhesive anchor installers.

g. Minutes of Preinstallation Meetings: Submit for review.

6. QUALITY ASSURANCE

a. Testing Laboratory Requirements: The Owner's Testing Laboratory shall:

1) Concrete Design Mixtures: Review the submitted design mixtures for conformance to the specifications and for suitability for use in the project.
2) Pre-Concrete Conference : Attend the pre-concrete conference referenced above.
3) Review adhesive anchor installer qualifications by certification. Obtain qualification certificates.

b. Qualifications:

1) Concrete Supplier: The concrete supplier shall have a minimum of five years of experience in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment. The supplier must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.
2) Concrete Contractor: The concrete contractor shall have a minimum of five years of experience with installation of concrete similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful service performance.
3) Adhesive Anchor Installers: The individuals performing the installation of adhesive anchors that are horizontally or upwardly inclined shall be certified in accordance with the ACI/CRSI Adhesive Anchor Installer Certification program.

c. Survey for Anchor Rods and Reinforcing Steel Dowels: The Contractor shall use a qualified surveyor to lay out the proper location of all embedded anchor rods and reinforcing steel dowels for columns above before they are encased in concrete.

d. Manufacturer Representative Presence:

1) Post-installed anchors: The manufacturer's representative for each post-installed anchor product (adhesive, expansion, undercut, screw, or insert anchor) shall be present during the first day's installation of the product to provide instruction for the correct installation of each type of any to be installed in accordance with the manufacturer's recommendation and the current ICC-ES Evaluation Report.

2 PRODUCTS

1. CONCRETE MATERIALS

a. Refer to the drawings for classes and strengths of concrete required.

b. Hydraulic Cement:

1) Use ASTM C150, Type II or Type V, Type GU or HE unless otherwise specified.

2) Use one brand of cement, for each class of concrete, throughout the project, unless approved otherwise by the Architect/Engineer and the Owner's Testing Laboratory. Submit mill certificates certifying conformance to this specification for each brand and type of cement.

3) Testing of cement in lieu of mill certificate submittal will be required if:

a) The cement has been in storage at the mixing site for over 30 days.

b) It is suspected by the Owner, Architect, Engineer, or Owner's Testing Laboratory that the cement has been damaged in storage or in transit or is in any way defective.

c. Low-alkali cement: Cement that has the additional requirement that equivalent alkalis (Na_2O + $0.658K_2O$) do not exceed 0.60% according to ASTM C 150-00, Table 2.

d. Fly Ash: ASTMC 618, Class C or F.

e. Silica Fume: ASTMC 1240, Amorphous Silica.

f. Slag Cement: ASTMC 989, Grade 100 or 120 or ASTM C 595, Type IS or Type S.

g. Normalweight Aggregates: ASTM C33, and as herein specified. Submit material certificates from aggregate supplier or test results from an independent testing agency certifying conformance to this specification for each source of aggregate.

1) For concrete identified on the drawings as exposed to Exposure Classes C1 and C2, submit certification that aggregate does not contain any deleterious materials that react with alkalis in the concrete mix to cause excessive expansion of the concrete for concrete that is exposed to wetting, has extended exposure to humid atmosphere, or is in contact with moist ground unless low-alkali cement is used.

h. Lightweight Aggregates: ASTM C330. Submit material certificates from aggregate supplier or test results from an independent testing agency certifying conformance to this specification for each source of aggregate.

i. Water: Comply with the requirements of ASTMC 1602.

2. ADMIXTURES

a. Air-Entraining Admixture: ASTM C260.

1) Subject to compliance with requirements, provide one of the following products and manufacturers:

a) W.R. Grace & Co.; Darex or Daravair series.

b) BASF Admixtures, Inc.; MB-VR, MB-AE90, or Micro-Air.

c) Sika Corporation; Sika AER.

d) The Euclid Chemical Company; Air Mix or AEA-92.

e) The Euclid Chemical Company; Eucon Air 30 or Eucon Air 40.

2) Submit manufacturer's certification that product conforms to the requirements specified and is compatible with all other admixtures to be used.

b. Water-Reducing Admixture: ASTM C494, Type A. See maximum permissible chloride ion content in concrete specified below.

1) Subject to compliance with requirements, provide one of the following products and manufacturers:

a) BASF Construction Chemicals; Pozzolith series or Glenium 7000.
b) Sika Chemical Corp.; Plastocrete 161.
c) The Euclid Chemical Company; Eucon WR-75 or WR-91.
d) W.R. Grace & Co.; WRDA series.
e) The Euclid Chemical Company; Eucon NW or Eucon LW.

2) Submit manufacturer's certification that product conforms to the requirements specified and is compatible with all other admixtures to be used.

c. Mid-Range Water-Reducing Admixture: ASTM C494, Type A and Type F. See maximum permissible chloride ion content in concrete specified below.

1) Subject to compliance with requirements, provide one of the following products and manufacturers:

a) BASF Construction Chemicals; Polyheed series or Glenium 7000.
b) The Euclid Chemical Company; Eucon MR.
c) Sika Chemical Corp.; Sikament HP.
d) W.R. Grace & Co.; Daracem or Mira series.
e) The Euclid Chemical Company; Eucon X-15 or Eucon X-20.

2) Submit manufacturer's certification that product conforms to the requirements specified and is compatible with all other admixtures to be used.

d. High-Range Water-Reducing Admixture (Superplasticizer): ASTM C494, Type F or Type G. See maximum permissible chloride ion content in concrete specified below.

1) Subject to compliance with requirements, provide one of the following products and manufacturers:

a) W.R. Grace & Co.; ADVA or Daracem Series.
b) BASF Construction Chemicals; Rheobuild 1000 or Glenium series.
c) Sika Chemical Corp.; Sikament.
d) The Euclid Chemical Company; Eucon 37/1037 or Plastol series.
e) The Euclid Chemical Company; Eucon SP or Eucon RD2.

2) Submit manufacturer's certification that product conforms to the requirements specified and is compatible with all other admixtures to be used.

e. Crystalline-Forming Waterproofing Admixture: A powder admixture capable of producing concrete that is water tight under hydrostatic pressure up to seven atmospheres when tested in accordance with Corps of Engineers test CRD-C48 and capable of sealing cracks up to 0.4 mm.

1) Products: Subject to compliance with requirements, provide the following at dosage rates per manufacturer's recommendation:

a) ICS/Penetron International/Ltd; Penetron Admix.

b) Kryton International, Inc.; Krystol Internal Membrane (ESR-1515).
c) Xypex Chemical Corporation; Xypex C series.
d) BASF Construction Chemicals; Rheomac 300D.

f. Calcium Chloride and Chloride Ion Content: Calcium chloride or admixtures containing more than 0.5% chloride ions by weight of the admixture are not permitted.

g. Certification: Written conformance to all the above-mentioned requirements and the chloride ion content of the admixture as tested by an accredited laboratory will be required from the admixture manufacturer at the time of design mixture review by the Engineer.

3. WATERSTOPS

a. Provide waterstops at all construction joints and other joints in all foundation walls below grade and where shown on the drawings. Size to suit joints.

b. Products:
1) Swell Hydrophilic Waterstops:

a) Manufacturers: W.R. Grace & Co.; ADCOR ES.

2) Polyvinyl Chloride (PVC) Waterstops: Comply with Corps of Engineers CRD-C 572. Provide flat, dumbbell type or centerbulb type as noted on the drawings.
3) Rubber Waterstops: Comply with Corps of Engineers CRD-C 513. Provide flat, dumbbell type or centerbulb type as noted on the drawings.
4) Preformed Plastic Waterstops: Comply with Federal Specifications SS-S-210A "Sealing Compound for Expansion Joints".

a) Manufacturers: Synko-Flex Products, Inc.

5) Bentonite Waterstops:

a) American Volclay Products; Bentonite Waterstop RX.

4. VAPOR RETARDERS

a. Provide vapor retarder cover chosen from products specified below over prepared base material where indicated.

1) Plastic Vapor Retarder: Provide a flexible, preformed sheet membrane conforming to ASTM E1745 with the following properties:

a) Class A material.
b) Minimum of 15 mils thick.
c) Maximum water vapor permeance rating of 0.01 perms after mandatory conditioning as tested by ASTM E96.
d) Manufacturer's recommended tape and mastic.
e) Acceptable products include the following:

(1) Stego Industries, LLC; Stego Wrap Vapor Barrier (15 mil).
(2) Epro; Ecoshield-E (15 mil).

(3) Raven Industries; VAPORBLOCK 15 (15 mil).

2) Bituminous Vapor Retarders: Provide a pre-molded membrane consisting of reinforced core and carrier sheet with fortified bitumen layers, protective weather coating, and plastic anti-stick sheet conforming to ASTM E1993 with the following properties:

a) Maximum water vapor permeance rating of 0.002 perms after mandatory conditioning as tested by ASTM E 96.
b) Manufacturer's recommended tape and mastic.
c) Acceptable products include the following:

(1) W.R. Meadows; Premoulded Membrane Vapor Seal with Plasmatic Core.

3) Tape for Plastic Vapor Retarders: High-density polyethylene tape with pressure sensitive adhesive having a minimum width of 3.75" having a maximum water vapor transmission rate of 0.3 perms.

5. FLOOR AND SLAB TREATMENTS

a. Slip-Resistive Emery Aggregate or Aluminum Granule Finish: Provide fused aluminum-oxide granules, or crushed emery, as abrasive aggregate for slip-resistive finish. The emery aggregate shall contain not less than 50% aluminum oxide and not less than 20% ferric oxide. The aluminum aggregate material shall contain not less than 95% fused aluminum-oxide granules. Use material that is factory-graded, packaged, rustproof, and non-glazing, and is unaffected by freezing, moisture, and cleaning materials.

1) Subject to compliance with requirements, provide one of the following:

a) Dayton-Superior; Emery Tuff Non-Slip.
b) L&M Construction Chemicals, Inc.; Grip-It or Grip-It AO.
c) Sonneborn-ChemRex; Frictex NS.

6. CURING MATERIALS

a. Liquid Membrane-Forming Curing and Curing and Sealing Compounds:

1) Water-Based Dissipating Resin Type Curing Compound: Curing Compound shall be a dissipating resin type, which chemically breaks down after approximately four weeks. Membrane forming compound shall meet ASTM C 309, Types 1 or 1D, Class B with a VOC content less than 350 grams per liter.

a) Products: Subject to compliance with requirements, provide one of the following:

(1) The Euclid Chemical Company; Kurez DR VOX.
(2) L&M Construction Chemicals; L&M Cure R.
(3) Unitex; Hydro Cure 309.
(4) W.R. Meadows; Sealtight 1100-Clear.
(5) US Mix Co.; US Spec Maxcure Resin Clear.
(6) SpecChem; SpecRez.

b) Submit manufacturer's certification that product conforms to the requirements specified and is compatible with any covering or surface treatments to be applied. Submit any instructions that must be followed prior to any subsequent surface treatments and floor coverings.

2) High Solids, Water-Based Acrylic Curing and Sealing Compound with Moderate Yellowing Characteristics: Water-Based membrane-forming curing and sealing compound conforming to ASTM C 1315, Type 1, Class B, classified as low odor with a VOC content less than 350 grams per liter. Product shall provide a maximum moisture loss of 0.030 kilograms per square meter in 72 hours when applied at a coverage rate of 300 square feet per gallon. Do not apply to surfaces that are to receive subsequent cementitious toppings, sealers, hardeners, ceramic tile, resilient flooring, vinyl-backed carpet, wood, terrazzo, epoxy overlays or adhesives, or other coating or finishing products.

a) Products: Subject to compliance with above requirements, provide one of the following products or equivalent products:

(1) Dayton-Superior; Safe Cure and Seal (J-19).
(2) The Euclid Chemical Company; Super Aqua-Cure VOX.
(3) L&M Construction Chemicals; Dress & Seal, 30 WB.
(4) BASF Building Systems; Masterkure 200W.
(5) SpecChem; Cure & Seal WB 25.

b) Submit manufacturer's certification that product conforms to the requirements specified and is compatible with any covering or surface treatments to be applied. Submit any instructions that must be followed prior to any subsequent surface treatments.

3) High Solids, Water-Based, Non-Yellowing Curing and Sealing Compound: Water based membrane-forming curing and sealing compound, acrylic type, complying with ASTM C 1315, Type 1, Class A classified as low odor with a VOC content less than 350 grams per liter. Do not apply to surfaces that are to receive subsequent cementitious toppings, sealers, hardeners, ceramic tile resilient flooring, vinyl-backed carpet, wood, terrazzo, epoxy overlays or adhesives, or other coating or finishing products.

a) Products: Subject to compliance with requirements, provide one of the following:

(1) The Euclid Chemical Company; Super Diamond Clear VOX.
(2) L&M Construction Chemicals; Lumiseal 30 WB.
(3) BASF Building Systems; Kure 1315.
(4) Unitex; Hydro Seal 30.
(5) W.R. Meadows; Vocomp 30.
(6) US Mix Co.; US Spec Radiance UV-25.
(7) SpecChem; Cure & Seal WB 30.

b) Submit manufacturer's certification that product conforms to the requirements specified and is compatible with any covering or surface treatments to be applied. Submit any instructions that must be followed prior to any subsequent surface treatments.

b. Evaporation Control: Monomolecular film forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss in hot, dry, or windy weather conditions.

1) Products: Subject to compliance with requirements, provide one of the following:

a) The Euclid Chemical Company; Eucobar.
b) L&M Construction Chemicals; E-Con.
c) BASF Building Systems; Confilm.
d) Dayton-Superior; Sure Film (J-74).
e) Sika Chemical Co.; SikaFilm.
f) Unitex; Pro-Film.
g) W.R. Meadows; Sealtight Evapre.
h) US Mix Co.; US Spec Monofilm ER.
i) SpecChem; SpecFilm RTU.

2) Submit manufacturer's certification that product conforms to the requirements specified and is compatible with all coverings and surface treatments to be applied. Submit any instructions that must be followed prior to any subsequent surface treatments.

c. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately nine ounces per square yard, complying with AASHTO M 182, Class 2.

d. Moisture-Retaining Cover: One of the following, complying with ANSI/ASTM C 171:

1) Waterproof paper.
2) Polyethylene film.
3) Polyethylene-coated burlap.
4) Polyethylene-coated natural cellulose fabric such as Greenstreak Group, Inc.; Aquacure.
5) Cover for Industrial Slab: Provide a low permeance moisture-retaining cover that allows a moisture loss of no more than one pound per square yard in 72 hours when tested in accordance with ATSM C 156 for industrial slabs. The material shall be non-staining and meet with requirements of ASTM C 171.

7. LIQUID FLOOR TREATMENTS

a. Chemical Hardener: Colorless aqueous solution containing a blend of magnesium fluosilicate and zinc fluosilicate combined with a wetting agent, containing not less than two pounds of fluosilicates per gallon.

1) Products: Subject to compliance with requirements, provide one of the following:

a) The Euclid Chemical Company; Surfhard.
b) BASF Building Systems; Lapidolith.
c) Dayton-Superior; Day-Chem Hardener (J-15).
d) L&M Construction Chemicals; Fluohard.
e) W.R. Meadows; Penalith.
f) SpecChem; Spec-O-Lith.

2) Submit manufacturer's certification that product conforms to the requirements specified and is compatible with all coverings or surface treatments to be received. Submit any instructions that must be followed prior to any subsequent surface treatments.

b. Chemical Curing/Floor Hardener Compound: Sodium silicate based compound that reacts with concrete constituents to harden the surface, resulting in a surface having a maximum abrasion coefficient of 0.25 cubic centimeters per square centimeter when tested in accordance with ASTM C 418.

1) Products: Subject to compliance with requirements, provide one of the following:

a) The Euclid Chemical Company; Eucosil.
b) BASF Building Systems; Sonosil.
c) Dayton-Superior; Day-Chem S.1-Cure (J-13).
d) L&M Construction Chemicals; Chem Hard.
e) Unitex; Uni Cure HD.
f) W.R. Meadows; Med-Cure.
g) US Mix Co.; US Spec Permasil.

2) Submit manufacturer's certification that product conforms to the requirements specified and is compatible with all coverings and surface treatments to be applied. Submit any instructions that must be followed prior to any subsequent surface treatments.

c. Water and Chloride Ion Repelling Penetrating Sealer: Clear, solvent free, Silane penetrating sealer which reacts chemically with the concrete surface to function as a Chloride Ion screen with a minimum 83% factor when tested in accordance with NCHRP #244, Series II and applied in accordance with the manufacturer's recommendation.

1) Products: Subject to compliance with requirements, provide one of the following:

a) 40% solids:

(1) BASF Building Systems; Enviroseal 40.
(2) Lymtal International, Inc.; Iso-flex 618-40 WB.
(3) SpecChem; SpecSilane WB 40.

b) 100% solids:

(1) Evonik Industries; Protectosil BH-N.

8. RELATED MATERIALS

a. Post-Installed Anchors:

1) ICC Approval: Only anchors evaluated by the ICC Evaluations Service, Inc. (ICC-ES) with a published Evaluation Report, valid at the time of installation, showing it as having passed Acceptance Criteria 193 and approval for use in cracked concrete and resisting wind and seismic loads shall be approved for use.
2) Alternate Anchor Approval: Install only anchors identified on the drawings by manufacturer and product. Substitutions using products approved by this Specification may be permitted provided complete design calculations, as required by and in accordance with the proposed product's current and valid ICC Evaluations Service Reports (ESR) and ACI 318 Appendix D, are signed and sealed by a registered professional engineer licensed in the state where the project is located and furnished to the Engineer for review and approval prior to commencement of work. The Contractor shall request design criteria for all conditions where a product substitution is considered. Failure to obtain approval for an anchor substitution may result in the request by the Engineer to remove installed anchors and replace with the product specified on the drawings at the Contractor's expense.
3) Installation: All installation of post-installed anchors shall be in accordance with the Manufacturer's Printed Installation Instructions (MPII).

4) Interior Use: All anchors for use in interior conditioned environments free of potential moisture shall be manufactured from carbon steel zinc plated in accordance with Federal Specification QQ-Z-325C, Type II, Class 3.
5) Exterior or Exposed Use: All anchors for use in exposed or potentially wet environments or for attachment of exterior cladding materials shall be galvanized or stainless steel. Galvanized anchors shall conform to ASTM A153. Stainless steel anchors shall be manufactured from 300 series stainless steel.
6) Nuts and Washers: Nuts and washers shall be furnished from the manufacturer and used with the anchors.
7) Expansion and Undercut Anchors in Concrete:

    a) Type: All expansion and undercut anchors in concrete shall be wedge type expansion, sleeve type expansion, or undercut type anchors.
    b) Acceptable Products and Manufacturers – Normalweight and Sand-Lightweight Concrete Not on Corrugated Steel Deck:

        (1) Hilti, Inc.; Kwik Bolt TZ (ESR-1917).
        (2) Hilti, Inc.; HDA Undercut Anchor (ESR-1546).
        (3) Hilti, Inc.; HSL-3 Heavy Duty Sleeve Anchor (ESR-1545).
        (4) Simpson Strong-Tie Co., Inc.; Strong-Bolt Wedge Anchor (ESR-1771).
        (5) Simpson Strong-Tie Co., Inc.; Strong-Bolt 2 Wedge Anchor (ESR-3037).

    c) Acceptable Products and Manufacturers – Normalweight and Sand-Lightweight Concrete on Corrugated Steel Deck:

        (1) Hilti, Inc.; Kwik Bolt TZ (ESR-1917).
        (2) Simpson Strong-Tie Co., Inc.; Strong-Bolt Wedge-Anchor (ESR-1771).

8) Screw and Insert Anchors in Concrete

    a) Acceptable Products and Manufacturers:

        (1) Hilti, Inc.; KWIK HUS-EZ Anchor (ESR-3027).
        (2) Simpson Strong-Tie Co., Inc.; Titen HD (ESR-2713).

9) Adhesive Anchoring Systems in Normalweight Concrete: Product that conforms to ASTM C 881-02, Type IV, Grade 3, Class A, B, & C except gel times, and that is dispensed from a two-component cartridge system through a mixing nozzle that thoroughly mixes the two components as it is injected into the hole.

    a) Chemical anchoring of anchors, rods, or reinforcing steel is not allowed for fire-rated assemblies, unless specified provided for in the drawings.
    b) Consult with the manufacturer for the minimum temperature of the concrete substrate allowed.
    c) Only personnel trained to install adhesive anchors and certified in accordance with the ACI/CRSI Adhesive Anchor Installer Certification Program shall install adhesive anchors, including reinforcing steel.
    d) All anchors installed horizontally or upwardly inclined require continuous inspection.
    e) All adhesive anchors shall be installed in concrete having a minimum age of 21 days at the time of anchor installation.
    f) Normalweight Concrete:

        (1) Hilti, Inc.; HIT-HY 200 (ESR-3187).

(2) Simpson Strong-Tie; SET-XP Adhesive (ESR-2508).

g) These products may not be used in concrete cast over corrugated deck.

h) Threaded Rods Chemically Anchored in Concrete:

(1) Type: Threaded rods installed in holes using a chemical anchoring process shall have a 45º chiseled end on the embedded end.

(2) Interior Application: Meet the requirements of ASTM A36 or A193, Grade B7.

(3) Exterior Application: Meet the requirements of ASTM A153 galvanized steel, or F593, Group 1 or 2, condition CW stainless steel.

b. Bonding Compound: Polyvinyl acetate or acrylic base, for use in cosmetic and/or nonstructural repairs.

1) Products: Subject to compliance with requirements, provide one of the following:

a) Acrylic or Styrene Butadiene:

(1) Dayton-Superior; Day-Chem Ad Bond (J-40).
(2) The Euclid Chemical Company; SBR Latex.
(3) W.R. Grace; Daraweld C.
(4) BASF Building Systems; Acrylic Additive.
(5) Sika Chemical Co.; SikaLatex.
(6) W.R. Meadows; Intralok.
(7) US Mix Co.; US Spec Acrylcoat.
(8) The Euclid Chemical Company; Akkro-7T.
(9) SpecChem; Acrylic Bonder.

b) Polyvinyl Acetate (Interior Use Only):

(1) The Euclid Chemical Company; Tammseld.
(2) L&M Construction Chemicals; Everweld.
(3) Dayton-Superior; Superior Concrete Bonder (J-41).
(4) US Mix Co.; US Spec Bondcoat.
(5) SpecChem; SpecWeld.

c. Epoxy Products: Two-component material suitable for use on dry or damp surface, complying with ASTM C881.

1) Products for Crack Repair:

a) Sika Chemical Co.; Sikadur 35 Hi Mod LV – injection type.
b) Sika Chemical Co.; Sikadur 52 – injection type.
c) Sika Chemical Co.; Sikadur 55 SLV – gravity feed.
d) The Euclid Chemical Company; Eucopoxy Injection Resin.
e) Dayton-Superior; Sure-Inject (J-56).
f) BASF Building Systems; Epofil SLV.
g) Simpson Strong-Tie Co., Inc.; ETI-LV or ETI-GV – injection type.
h) Unitex; Pro-Poxy 100 LV or Pro-Poxy 50-1.
i) Adhesives Technology; Crackbond.
j) W.R. Meadows; Rezi-Weld LV.
k) US Mix Co.; US Spec Maxibond – injection or gravity feed.
l) US Mix Co.; US Spec Eposeal LVS – gravity feed.

m) The Euclid Chemical Company; Duralcrete LV.
n) SpecChem; SpecPoxy 1000.

2) Products for Epoxy Mortar Patches:

a) Sika Chemical Co.; Sikadur Lo-Mod LV.
b) The Euclid Chemical Company; Duracrete Series.
c) Dayton-Superior; Sure Level Epoxy (J-57).
d) BASF Building Systems; Epofil.
e) Unitex; Pro-Poxy 2500.
f) W.R. Meadows; Rezi-Weld 1000.
g) US Mix Co.; US Spec EPM 3000.
h) The Euclid Chemical Company; Duralcrete LV.
i) SpecChem; SpecPoxy Binder.

d. Reglets: Where resilient or elastomeric sheet flashing or bituminous membrane is terminated in reglets, provide reglets of not less than 26 gauge galvanized sheet steel. Fill reglet or cover face opening to prevent intrusion of concrete or debris.

e. Joint-Filler Strips for Isolation Joints in Slabs-on-Grade: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

9. REPAIR MATERIALS

a. Self-Leveling Mortars, Underlayment Compound: Freeflowing, self-leveling, pumpable cementitious base compound. Follow manufacturer's instruction regarding the use of a bonding agent.

1) Products: Unless specified otherwise, provide one of the following:

a) BASF Building Systems; Sonoflow.
b) Sika Chemical Co.; Sikatop 111.
c) The Euclid Chemical Company; Flo-Top or Super Flo-Top.
d) Dayton-Superior; Levelayer I.
e) US Mix Co.; US Spec Self-Leveling Underlayment.
f) The Euclid Chemical Company; Level Magic.
g) SpecChem; SpecFlow.

b. Polymer Patching Mortar: Polymer and microsilica modified cementitious-based compounds.

1) Products:

a) Horizontal Application:

(1) The Euclid Chemical Company; Thin Top Supreme, Concrete Top Supreme.
(2) Sika Chemical Co.; Sikatop 121 or 122.
(3) BASF Building Systems; Emaco R310 CI.
(4) BASF Building Systems; Sonopatch 100 or 200.
(5) US Mix Co.; US Spec H2 or NuTop.
(6) The Euclid Chemical Company; Speed Crete PM.
(7) SpecChem; RepCon H.

b) Upwardly Inclined Application:

(1) The Euclid Chemical Company; Verticoat/Verticoat Supreme.
(2) Sika Chemical Co.; Sikatop 123.
(3) BASF Building Systems; Emaco R350 CI.
(4) BASF Building Systems; Sonopatch 200.
(5) US Mix Co.; US Spec V/O Patch.
(6) The Euclid Chemical Company; Speed Crete PM.
(7) SpecChem; RepCon V/O.

c. High Strength Flowing Repair Mortar: For forming and pouring structural members, or large horizontal repairs, provide flowable one-part, high strength microsilica polymer modified repair mortar with 3/8" aggregate. The product shall achieve 9,000 PSI at 28-days at a nine inch slump.

1) Products:

a) BASF Building Systems; Road Patch.
b) US Mix Co.; US Spec STR Mortar.
c) The Euclid Chemical Company; Eucocrete.
d) The Euclid Chemical Company; Tamms Form and Pour.
e) SpecChem; RepCon 928.

d. Anti-Corrosive Epoxy/Cementitious Adhesive: Water-based epoxy/cementitious compound for adhesion and corrosion protection or reinforcing members (20 hour maximum open time).

1) Products:

a) The Euclid Chemical Company; Duralprep A.C.
b) Sika Chemical Co.; Armatec 110.
c) BASF Building Systems; Sonoprep Plus.

10. PROPORTIONING AND DESIGN OF CONCRETE MIXTURES

a. The Contractor shall submit design concrete mixtures for each class of concrete indicated on the structural drawings and in the Specifications for approval by the Engineer and Owner's Testing Laboratory at least 15 working days prior to the start of construction. If required, the Contractor shall engage the services of an independent Testing Laboratory to assist in preparing the design mixtures. The Contractor shall not begin work with a particular mixture until that design mixture has been approved.

b. The Contractor, acting in conjunction with his Concrete Supplier and his Testing Laboratory, shall submit in writing, with his design mixtures, the method used to select mixture proportions. Either of the following methods, as outlined in ACI 301, may be used:

1) Field Experience Method.
2) Laboratory Trial Mixture Method.

c. Required types of concrete and compressive strengths shall be as indicated on the Structural Drawings.

d. All design mixtures shall state the following information:

1) Design mixture number or code designation by which the Contractor shall order the concrete from the Supplier.
2) Identify design mixture usage (i.e., columns, shear walls, footings, slab-on-grade, etc.).
3) Wet and dry unit weights.
4) Compressive strength and associated age (28-day, 56-day, etc.).
5) Aggregate type, source, size, gradation, fineness modulus.
6) Cement type and brand.
7) Fly ash or other pozzolan type and brand (if any).
8) Admixtures including air entrainment, water reducers, high-range water reducers, etc.
9) Design slump or slump/flow.
10) Proportions of each material used.
11) Water/cementitious ratio and maximum allowable water content.
12) Method by which the concrete is intended to be placed (bucket, chute, or pump).
13) Required average strength qualification calculations per ACI 301 4.2.3.3a and 4.2.3.3b. Submit separate qualification calculations for each production facility that will supply concrete to the project.
14) Documentation of Average Strength (Trial Mixture Data or Field Test Data) per ACI 301: When field test data is used to qualify average strength, submit separate documentation for each production facility that will supply concrete to the project.
15) Field test data submitted for qualification of average strength under ACI 301 shall include copies of the Concrete Testing Agency's reports from which the data was compiled.

e. Low Alkali Concrete: For concrete identified on the drawings as Exposure Classes C1 and C2, the total alkali contribution from cementitious materials in the concrete mix shall not exceed 4.0 pounds per cubic yard of concrete unless the aggregate used is certified to contain no deleterious materials that react with alkalis in the concrete mix as defined in ASTM C33. This requirement may be met by the use of low-alkali cement.

f. Supplementary Cementitious Materials: Fly ash and/or ground granulated blast-furnace slag replacement of Portland cement shall be within percentage replacement levels listed on the drawings unless noted otherwise. Every effort should be made to reduce the amount of cement to the minimum practical amount, and still achieve performance requirements contained in the Contract Documents.

1) Cement replacement shall not exceed a percentage level that has been shown by experience on other projects to exhibit satisfactory performance using materials from identical sources as proposed for this project. As an alternate, trial concrete batches can be performed to identify design mixtures that maximize cement replacement while meeting strength requirements per ACI 318 Section 5.3 and finishability criteria.
2) The use of fly ash or slag in architecturally exposed structural concrete shall be coordinated with the Architect, Engineer, and Contractor.
3) If fly ash is used, it must be at a minimum replacement percentage of 15%.
4) Overall replacement percentages with combined fly ash and slag shall not exceed the maximum identified with slag or be less than the minimum identified with fly ash for each type of element. In addition, the replacement percentage of fly ash within the combined mixture shall not exceed the maximum identified with fly ash alone.
5) Replacement percentages exceeding the maximum may be permitted at the discretion of the Architect, Engineer of Record, and Contractor.
6) Except for Mass Concrete, the Contractor may submit for approval a revised design mixture with lower supplementary cementitious material percentages than herein specified should finishability or other issues arise due to changing weather conditions.

g. Aggregate: Comply with the following special requirements:

1) For exposed concrete, provide aggregates from a single source.
2) For exposed surfaces subject to Exposure Class C1 or C2, do not use aggregates containing spalling-causing deleterious substances.

h. Admixtures:

1) Admixtures to be used in concrete shall be subject to the approval of the Engineer and Owner's Testing Laboratory and shall be used for the purpose intended by the manufacturer to produce concrete to meet the specified requirements.
2) Quantities of admixtures to be used shall be in strict accordance with the manufacturer's instructions.

i. Lightweight Structural Concrete: Comply with the requirements of ACI 301, Section 7.

j. Adjustments of Concrete Mixtures: Design mixture adjustments may be requested by the Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant. Such adjustments shall be provided at no additional cost to the Owner. Any adjustments in approved design mixtures including changes in admixtures shall be submitted in writing to the Engineer and Owner's Testing Laboratory for approval prior to field use.

k. Chloride Ion Content:

1) Unless noted otherwise, the maximum water soluble chloride ion concentration in hardened concrete measured at ages from 28 to 42 days contributed from all ingredients including water, aggregates, cementitious materials, and admixtures shall not exceed the limits specified in ACI 301 Table 4.2.2.7.a.1 "Requirements for establishing suitability of cementitious materials combinations exposed to water-soluble sulfate" depending on which Corrosion Exposure Class (C0, C1 or C2) the concrete is subject as noted on the drawings. Water-soluble chloride ion tests shall conform to ASTM C1218.
2) The Concrete Supplier shall certify that the chloride ion content in all concrete design mixtures used on the project does not exceed the limits stated above.

11. CONCRETE MIXING

a. Ready-Mix Concrete: Comply with requirements of ANSI/ASTM C 94.

12. SOURCE QUALITY CONTROL

a. Source Inspection:

1) Concrete Batch Plant Inspection: Unless waived by the Owner, an initial batch plant inspection shall be made by the Testing Laboratory prior to the start of concrete work. The scope of batch plant inspection shall include the following:

a) Inspection of Batch Plant Facilities: The Testing Laboratory shall inspect batch plant facilities proposed for use in the work and report in writing inspection results to the Architect, Engineer, and Owner for approval. The inspection shall confirm the batch plant conforms to the standards set forth in ASTM C 94 and can show proof of certification by the National Concrete Ready Mix Association. Inspection shall include:

(1) Batch Plant operations and equipment.
(2) Truck mixers.
(3) Scales.
(4) Stockpile placement.
(5) Material storage.
(6) Admixture dispensers.

b) Multiple Batch Plants: The Contractor shall reimburse the Owner for the costs accrued to the Testing Laboratory for visits to more than one batch plant.

3 EXECUTION

1. SLUMP LIMIT

a. The slump, as measured in the field where concrete cylinders are taken, shall be within plus or minus one inch of the design slump noted in the approved Design Mixture submittal. Water may be added to the concrete in the field only to the extent that the prescribed water/cementitious ratio noted in the approved Design Mixture submittal is not exceeded. The responsibility for adding water to trucks at the job site shall rest only with the Contractor's designated representative. The Contractor is responsible that all concrete placed in the field is in conformance with the Contract Documents.

2. VAPOR RETARDER INSTALLATION

a. Install and repair damaged vapor retarder in accordance with ASTM E1643 and manufacturer's instructions.

b. Lap all seams per manufacturer's instruction (6" minimum lap) and seal all joints in the field with the specified pressure sensitive tape. Heat-welded joints done in a shop prior to delivery is an acceptable method to minimize the number of field joints.

c. Seal all pipe penetrations through the vapor retarder with a boot made from the vapor retarder material and tape or mastic.

3. JOINTS IN CONCRETE

a. Construction Joints: Locate and install construction joints as indicated on the drawings or if not shown on drawings, located so as not to impair strength and appearance of the structure, as acceptable to Architect/Engineer.

1) Keyways: Provide keyways with a depth of one tenth of the member thickness (1 1/2" minimum or as shown on the drawings) in construction joints only where shown on the drawings.
2) Joint Construction: Place construction joints in the center one third of suspended spans and grade beams and as shown on the drawings for slabs-on-grade and walls unless shown otherwise. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise shown on the drawings. Dowels that cross construction joints shall be supported during concreting operations so as to

remain parallel with the slab or wall surface and at right angles to the joint. Submit all construction joint locations as a shop drawing submittal.

3) Waterstops: Provide waterstops in construction joints as indicated on the Architectural and Structural Drawings. Install waterstops to form continuous diaphragm in each joint. Make provisions to support and protect exposed waterstops during progress of work. Fabricate field joints in waterstops in accordance with manufacturer's printed instructions.

4) Isolation Joints in Slabs-on-Grade: Construct isolation joints (without dowels) in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces only where specifically detailed on the drawings. Install joint-filler strips at joints where indicated. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated on the drawings. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together. Provide construction joints with dowels at all locations unless isolation joints are detailed.

b. Contraction Joints in Slabs-on-Grade: Install contraction joints at locations and spacings as indicated on the drawings or if not shown on drawings, located so as not to impair strength and appearance of the structure, as acceptable to Architect/Engineer. Maximum joint spacing shall be per the drawings and be perpendicular to the slab surface. Use one of the two following methods (sawed or formed) to create the joints.

1) Sawed Joints:

a) Primary Method: Early-Entry, dry-cut method, using Soff-Cut saws. Finisher must have documented successful experience in the use of this method prior to this project. Install cuts within one to four hours, depending on air temperature, after final finish as soon as the concrete surface is firm enough to not be torn or damaged by the blade at each saw cut location. Use 1/8 inch thick blade, cutting to a depth of one quarter of the slab thickness but not less than one inch.

b) Optional Method (where Soff-Cut System method equipment is not available, subject to limitations): This method may not be used when there is no dowel passing through the contraction joint. Use a conventional saw to cut joints within four to 12 hours after finishing as soon as the concrete has hardened sufficiently to prevent aggregates from being dislodged by the saw. Complete cutting before shrinkage stresses become sufficient to produce cracking. Use 1/8 inch thick blade, cutting to a depth of one quarter of the slab thickness but not less than one inch.

2) Formed Joints: Form contraction joints by inserting premolded plastic hardboard or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. The depth is to be one quarter of the slab thickness, but not less than one inch. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.

3) The Contractor shall protect the joints from damage caused by wheeled traffic or other sources during construction.

4. INSTALLATION OF EMBEDDED ITEMS

a. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto unless directed otherwise by these specifications. Install reglets to receive top edge of foundation sheet waterproofing where specified by the Architect, and to receive thru-wall flashings in outer face of

concrete frame at exterior walls, where flashing is shown at lintels, relieving angles and other conditions.

b. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

c. Do not install sleeves in any concrete member except where shown on the structural drawings or approved by the Architect and Engineer.

d. Securely fasten embedded plates, angles, anchor rods and other items to be built into the concrete to the formwork or hold in place with templates. Insertion of these items into concrete after concrete placement is prohibited.

5. CONCRETE PLACEMENT

a. Pre-placement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other trades to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.

b. Concrete Batch Trip Tickets: The Contractor shall collect and retain concrete batch trip tickets. Compressive strength, slump, air content, and temperature tests shall be identified by reference to a particular trip ticket. Tickets shall contain the information specified in ASTM C94. Each ticket shall also show the amount of water that may be added in the field for the entire batch that will not exceed the specified water cement ratio for the design mixture. The Contractor and Testing Laboratory shall immediately notify the Architect/Engineer and each other of tickets not meeting the criteria specified.

c. Causes for Rejection of Concrete: The Contractor shall reject concrete delivered to the site for any of the following reasons:

1) Wrong class of concrete (incorrect design mixture number).
2) Environmental condition limits shall be as follows unless appropriate provisions in concrete practices have been made for cold or hot weather:

a) Cold Weather: Air temperature must be 40°F and rising or the average daily temperature cannot have been lower than 40°F for three consecutive days unless the temperature rose above 50°F for at least one-half of any of those 24 hour periods.
b) Hot Weather: Environmental conditions must be such that cause an evaporation rate from the concrete surface of 0.2 pounds per square foot per hour or less as determined by the figure “NRMCA Nomograph for Estimating Evaporation Rate on the Basis of Menzel Formula” in Appendix A of ACI 305.1.
c) Concrete may be placed at other environmental condition ranges only with the approval of the job inspector for the Testing Laboratory or other duly appointed representative.

3) Concrete with temperatures exceeding 95°F.
4) Air contents outside the limits specified in the design mixtures.
5) Slumps outside the limits specified.

6) Water added to the mix that exceeds the maximum allowed water-to-cementitious material ratio.
7) Excessive Age: Concrete shall be discharged within 90 minutes of plant departure or before it begins to set if sooner than 90 minutes and it shall be discharged before the drum has revolved 300 revolutions, unless approved by the Testing Laboratory job inspector or other duly appointed representative.

d. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

e. Comply with ACI 301 and as herein specified:

1) Concrete Temperature: The maximum acceptable concrete temperature at the truck discharge point shall be 95°F.
2) Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete that has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation. Spread concrete using short-handled, square-ended shovels, or come-alongs.
3) Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
4) Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use internal vibrators of the largest size and power that can properly be used in the work.
5) Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to penetrate rapidly placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
6) Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed. Place concrete for beams, girders, brackets, column capitals, haunches, and drop panels at the same time as concrete for slabs. Do not place concrete over columns and walls until concrete in columns and walls is no longer plastic and has been in place at least one hour.
7) Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners of forms, eliminating air and stone pockets that may cause honeycombing, pitting, or planes of weakness.
8) Bring slab surfaces to correct level with straightedge and strikeoff. Use highway straightedges, bull floats, or darbies to smooth surface free of humps or hollows before excess moisture or bleedwater appears on the surface. Do not disturb slab surfaces prior to beginning finishing operations.
9) Maintain reinforcing in proper position during concrete placement operations.
10) Protect adjacent finish materials against damage and spatter during concrete placement.
11) Placing Concrete by Pump: If concrete is placed by using a pump, the grout used for pump priming must not become a part of the completed structure unless an engineered grout design mix and grout location are approved in advance by the Engineer.

6. FINISH OF FORMED SURFACES

a. General: Formed surfaces shall have the finishes as described below and as shown on the drawings after formwork is removed and repairs made.

b. Classifications and Finish Requirements:

1) Surface Finish 1.1 (SF-1.1):

a) No formwork facing material is specified.
b) Patch voids larger than 1 inch wide or 1/2 inch deep.
c) Remove projections larger than 1/2 inch.
d) Provide surface tolerance Class C as specified in ACI 117.
e) Tie holes need not be patched.

2) Surface Finish 2.2 (SF-2.2):

a) Provide specified formwork-facing material.
b) Patch voids larger than 3/4 inch wide or 1/2 inch deep.
c) Patch tie holes.
d) Remove projections larger than 1/4 inch.
e) Provide surface tolerance Class B as specified in ACI 117.

c. Standard Finish: Provide SF-1.1 on all concrete surfaces not exposed to view in the final condition unless otherwise specified.

d. Exposed Finishes: Provide SF-2.2 on all concrete surfaces exposed to view in final condition unless otherwise specified.

e. Related Unformed Surfaces: At tops of walls, horizontal offsets and similar unformed surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

7. MONOLITHIC SLAB FINISHES

a. Place, consolidate, strike off, and level concrete, eliminating high spots and low spots, before proceeding with any other finish operation. Do not add water to the surface of the concrete during finishing operation.

b. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated. After screeding, consolidating and leveling concrete slabs, do not work surface until ready for floating. Begin floating, using a hand float, a bladed power float equipped with float shoes, or a powered disk float, when the bleed water sheen has disappeared and the concrete surface has stiffened sufficiently to permit the operation. Check and level surface plane to a tolerance as specified below. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

c. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint or other thin film

finish coating system. After floating, begin first trowel finish operation by hand or power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with a level surface to a tolerance as specified below. Grind smooth surface defects that would telegraph through applied floor covering system.

d. Slip-Resistive Broom Finish: Apply slip-resistive broom finish to garage floors and ramps less than 6% slope, exterior concrete platforms, steps, and ramps and elsewhere as indicated. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application. For concrete containing fibers, broom once only in one direction.

e. Chemical-Hardener Finish: Apply chemical-hardener finish to interior concrete floors where indicated. Apply liquid chemical-hardener after complete curing and drying of the concrete surface. Apply proprietary chemical hardeners, in strict accordance with manufacturer's printed instructions. After final coat of chemical-hardener solution is applied and dried, remove surplus hardener by scrubbing and mopping with water.

f. Slip-Resistive Aggregate Finish: Apply slip-resistive aggregate finish to concrete stair treads, platforms, ramps, and elsewhere as indicated on the Architect's or Structural Drawings.

1) After completion of float finishing, and before starting trowel finish, uniformly spread 25 pounds of dampened slip-resistive aggregate per 100 square feet of surface. Tamp aggregate flush with surface using a steel trowel, but do not force below surface. After broadcasting and tamping, apply trowel finishing as herein specified.
2) After curing, lightly work surface with a steel wire brush, or an abrasive stone, and water to expose slip-resistive aggregate.

g. Finish of Top of Spread Footings and/or Mat Foundations:

1) Top Surface below Finished Slab: The top of the footing or mat shall be screeded level and smooth with a flatness F-number, F_F15 (overall), F_F10 (minimum local) and a levelness F-number, F_L12 (overall), F_L10 (minimum local).
2) Top Surface as Finished Slab: The top surface of a footing or mat that is to serve as the finished slab in the building shall be leveled, cured, and surface prepared as specified for the finished floor construction appropriate to the space usage as defined in the Architectural Drawings.

8. CONCRETE FINISH MEASUREMENT AND TOLERANCES

a. Testing Procedure: ASTM E1155.

b. Tolerance on Floor Elevations: Construction tolerance on absolute floor elevation from the specified elevation as shown on the drawings shall be ±3/4", as taken from ACI 117:

c. Floor Finish Tolerances:

1) Specified overall values for flatness (SOF_F) and levelness (SOF_L) shall conform to the following values for conventional concrete slab-on-grade construction: SOF_F = 20 and SOF_L = 15.

2) Minimum local values for flatness (MLF_F) and levelness (MLF_L) shall equal 3/5 of the SOF_F and SOF_L values, respectively, unless noted otherwise. The MLF_F and MLF_L values shall apply to the minimum areas bounded by the column lines and half-column lines, or the minimum areas bounded by the construction and contraction joints, whichever are the smaller areas.
3) The SOF_L and MFL_L tolerance values shall apply only to level slabs-on-ground or to level, uncambered suspended slabs that are shored such that it cannot deflect from the time the floor is placed to the time it is measured.
4) Slabs specified to slope shall have a tolerance from the specified slope of 3/8" in 10 feet at any point.

d. Construction Requirements to Achieve Specified Floor Finish Tolerances:

1) Forms shall be properly leveled, in good condition, and securely anchored including special attention to ends and transitions.
2) Bearing surfaces for straightedges such as form edges or previously poured slabs shall be kept clean of laitance, sand, gravel, or other foreign elements.
3) Screeds shall be maintained in good condition with true round rolling wheels and level cutting edges. The use of optical sighting equipment such as lasers is recommended for checking levelness and straightness. The Contractor shall promptly adjust or replace equipment when test results indicate substandard work.
4) Highway straightedges are recommended for use in lieu of bullfloats for all slab placement and finishing operations. If mineral, non-oxidizing metallic, or metallic floor hardeners are used, the slab shall be wood bullfloated immediately after the straightedge.
5) Concrete Placement: Concrete shall be placed and screeded to predetermined marks set to elevations prescribed on the drawings

e. Contractor Responsibility for Concrete Floor Finish Requirements: Floor finish requirements shown below (flatness and levelness tolerances) are minimum requirements that apply unless stricter requirements are contained in instructions for installation of applied floor products in which case the Contractor is responsible for attaining the values prescribed by the manufacturer of such products.

f. Remedial Measures for Slab Finish Construction Not Meeting Specified Tolerances:

1) Application of Remedial Measures. Remedial measures specified herein are required whenever either or both of the following occur:

a) The composite overall values of F_F or F_L of the entire floor installation measure less than specified values.
b) Any individual test section measures less than the specified absolute minimum F_F or F_L value.

2) Modification of Existing Surface:

a) If, in the opinion of the Architect/Engineer or Owner's Representative, all or any portion of the substandard work can be repaired without sacrifice to the appearance or serviceability of the area, then the Contractor shall immediately undertake the approved repair method.
b) The Contractor shall submit for review and approval a detailed work plan of the proposed repair showing areas to be repaired, method of repair, and time to affect the repair.

c) Repair method(s), at the sole discretion of the Architect/Engineer or Owner's Representative, may include grinding (floor stoning), planing, retopping with self-leveling underlayment compound or repair topping, or any combination of the above.

d) The Architect/Engineer or Owner's Representative maintains the right to require a test repair section using the approved method of repair for review and approval to demonstrate a satisfactory end product. If, in the opinion of the Architect/Engineer or Owner's Representative, the repair is not satisfactory an alternate method of repair shall be submitted or the defective area shall be replaced.

e) The judgment of the Architect/Engineer or Owner's Representative on the appropriateness of a repair method and its ability to achieve the desired end product shall be final.

f) All repair work shall be performed at no additional cost to the Owner and with no extension to the construction schedule.

3) Removal and Replacement:

a) If, in the opinion of the Architect/Engineer or Owner's Representative, all or any portion of the substandard work cannot be satisfactorily repaired without sacrifice to the appearance or serviceability of the area, then the Contractor shall immediately commence to remove and replace the defective work.

b) Replacement section boundaries shall be made to coincide with the test section boundaries as previously defined.

c) Sections requiring replacement shall be removed by sawcutting along the section boundary lines to provide a neat clean joint between new replacement floor and existing floor.

d) The new section shall be reinforced the same as the removed section and doweled into the existing floor as required by the Engineer. No existing removed reinforcing steel may be used. All reinforcing steel shall be new steel.

e) Replacement sections may be retested for compliance at the discretion of the Architect/Engineer or Owner's Representative.

f) The judgment of the Architect/Engineer or Owner's Representative on the need for replacement shall be final.

g) All replacement work shall be performed at no additional cost to the Owner and with no extension to the construction schedule.

9. CONCRETE CURING AND PROTECTION

a. General:

1) Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Maintain concrete with minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of concrete. Limit moisture loss to a maximum of 0.05 pounds per square foot per hour for concrete containing silica fume and 0.2 pounds per square foot per hour for all other concrete before and during finishing operations. If using an evaporation retarder, apply in accordance with manufacturer's instructions after screeding and bull floating, but before power floating and troweling.

2) Curing shall commence as soon as free water has disappeared from the concrete surface after placing and finishing. The curing period shall be seven days for all concrete except high early strength concrete that shall be cured for three days minimum.

3) Alternatively, curing times may be reduced if either of the following provisions is complied with:

a) If tests are made of cylinders kept adjacent to the structure and cured by the same methods, curing measures may be terminated when the average compressive strength has reached 70% of the specified compressive strength.

b) If the temperature of the concrete is maintained at a minimum of 50°F for the same length of time required for laboratory cured cylinders of the same concrete to reach 85% of the specified compressive strength, then curing may be terminated thereafter.

4) Curing shall be in accordance with ACI 301 procedures. Avoid rapid drying at the end of the curing period.

b. Curing Formed Surfaces: Where wooden forms are used, cure formed concrete surfaces by moist curing with forms in place for full curing period or until forms are removed. When forms are removed, continue curing by one or a combination of the methods specified below, as applicable:

1) Columns and Walls Exposed to View: Moist cure in forms or by one or a combination of Methods 1, 2, or 3 specified below. Use a high-solids, non-yellowing, liquid membrane-forming curing and sealing compound conforming to ASTM C 1315, Type 1, class A for Method 3.

2) Basement Walls, Sides of Exterior Retaining Walls: Moist cure in forms or by one or a combination of Methods 1, 2, or 3 specified below. Use a liquid membrane-forming dissipating resin curing compound conforming to ASTM C 309, Type 1, class A or B for Method 3.

c. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by one or a combination of the methods specified below, as applicable. The Contractor shall choose a curing method that is compatible with the requirements for subsequent material usage on the concrete surface.

1) Floors in Non-Public Spaces that are Left Exposed to View and Not Receiving Sealers or Hardeners, Floors Involved in Under-Floor Air Distribution Systems: Apply one coat of a high-solids, water-based, non-yellowing, liquid membrane-forming curing and sealing compound conforming to ASTM C 1315, Type 1, Class A or B in accordance with Method 3 as specified below.

2) Floors that are to Receive Sealers, Hardeners, Vinyl Composition Tile, Sheet Vinyl, Linoleum, Vinyl-Backed Carpet, Epoxy Overlay or Adhesive, or Other Coating or Finishing Products: Cure using Methods 2 or 3 as specified below. Use a water-based dissipating resin type curing compound conforming to ASTM C 309, Type 1, class A or B for Method 3.

3) All Other Surfaces: Cure using Methods 1, 2, or 3 as specified below. Use a water-based dissipating resin type curing compound conforming to ASTM C 309, Type 1, class A or B for Method 3.

d. Curing Methods:

1) Method 1 – Moisture Curing: Provide moisture curing by one of the following methods:

a) Keep concrete surface continuously wet by covering with water.

b) Continuous water-fog spray.

c) Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water, and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

2) Method 2 – Moisture-Retaining Cover Curing: Provide moisture-retaining cover curing as follows:

a) Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape. Water may be added to concrete surface to prevent drying before the cover is installed, but the surface shall not be flooded with water if a non-absorptive cover is used.

3) Method 3 – Curing or Curing and Sealing Compound: Provide curing, liquid membrane-forming curing, or curing and sealing compound as follows:

a) Apply specified compound to concrete slabs as soon as final finishing operations are complete (within two hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Do not allow to puddle. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period. Apply second coat for sealing two to three hours after the first coat was applied.

b) Do not use membrane-forming curing and sealing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, glued-down carpet, vinyl composition tile, linoleum, sheet vinyl, rubber, athletic flooring, synthetic turf, or wood), paint, or other coatings and finish materials. Dissipating resin type cures are acceptable in these locations.

10. HOT WEATHER CONCRETING

a. Definition: Conditions warranting hot weather concreting practices are defined as any combination of high air temperature, low relative humidity, and wind velocity tending to impair the quality of fresh or hardened concrete or otherwise result in abnormal properties. If conditions cause an evaporation rate of 0.2 pounds per square foot per hour or greater as calculated by the figure "NRMCA Nomograph for Estimating Evaporation Rate on the Basis of Menzel Formula" in Appendix A of ACI 305.1, then precautions shall be taken to prevent plastic shrinkage cracks from occurring

b. Specification: Follow hot weather concreting practices specified below when required to limit the concrete temperature at the truck discharge point to the stated maximum acceptable temperature.

c. Records: Under hot weather conditions, the Contractor shall keep records of outside air temperature, concrete temperature at truck discharge and general weather conditions.

d. Hot Weather Concreting Requirements: The following items, all or in part as required, shall be followed to limit the concrete temperature to the stated maximum acceptable temperature and to minimize the possibility of plastic shrinkage cracks from developing.

1) Design the concrete mixtures specifically for hot weather conditions replacing some cement with fly ash or other pozzolan and using a water reducing retarding admixture (ASTM C 494 Type D).
2) Use the largest size and amount of coarse aggregate compatible with the job.
3) Use sunshades and/or windbreaks.
4) Delay construction of indoor slabs-on-grade until the walls and roof are constructed.
5) Cool and shade aggregate stockpiles.
6) Use ice as part of the mixing water or cool the water with liquid nitrogen. Do not place concrete that contains unmelted ice.

7) Limit the number of revolutions at mixing speed to 125 maximum.
8) Reduce time between mixing and placing as much as possible.
9) Do not add water to ready-mixed concrete at the job site unless it is part of the amount required initially for the specified water-cement ratio and the specified slump.
10) Schedule concrete placement for early morning, late afternoon, or night.
11) Have all forms, equipment, and workers ready to receive and handle concrete.
12) Maintain one standby vibrator for every three vibrators used.
13) Keep all equipment and material cool by spraying with water including exteriors of forms, reinforcing steel, subgrade, chutes, conveyors, pump lines, tremies, and buggies.
14) Protect slab concrete at all stages against undue evaporation by applying a fog spray or mist above the surface or applying a monomolecular film. Where high temperatures and/or placing conditions dictate, use water-reducing retarding admixture (Type D) in lieu of the water-reducing admixture (Type A) as directed by the Owner's Testing Laboratory.
15) Provide continuous curing, preferably with water, during the first 24 hours using wet burlap, cotton mats, continuous spray mist, or by applying a curing compound meeting ASTM C1315. Continue curing for three days minimum.
16) Cover reinforcing steel with water soaked burlap so that steel temperature will not exceed ambient air temperature immediately before placement of concrete.
17) As soon as possible, loosen forms and run water down the inside. When forms are removed, provide a wet cover to newly exposed surfaces.

11. COLD WEATHER CONCRETING

a. Definition:

1) Concrete shall not be placed when the outside air temperature is 40°F or less unless cold weather concreting practices are followed as specified below.
2) Cold weather concreting practices should also be followed whenever the average daily air temperature is expected to be less than 40°F for more than three successive days. The average daily air temperature is the average of the highest and lowest temperature occurring during the period from midnight to midnight. The requirement for adhering to these cold-weather concreting practices may be terminated when the air temperature is above 50º F for more than half of any 24 hour duration.
3) Cold-weather concreting practices invoked shall keep the temperature of the concrete immediately after placing within the following temperature ranges:

a) 55º to 75º F for sections less than 12 inches in the least dimension.
b) 50º to 70º F for sections 12 to 36 inches in the least dimension.
c) 45º to 65º F for sections 36 to 72 inches in the least dimension.
d) 40º to 60º F for sections greater than 72 inches in the least dimension.

b. Concrete Protection:

1) Protect the concrete immediately after placing and during the defined protection period such that the concrete does not freeze nor fall below the temperature levels stated in the above paragraph. For concrete not loaded during construction, the protection period shall be for a minimum of three days if cold-weather conditions persist. The time may be reduced to a minimum of two days if Type III cement or an accelerating admixture is used or if an additional 100 pounds of cement per cubic yard is added to the concrete mix. Concrete fully loaded during construction shall be protected during cold weather conditions for whatever time is required to obtain the required strength as determined by nondestructive strength tests (Windsor probe, Swiss Hammer Test) on the in-place concrete. Protect

concrete surfaces from freezing for the first 24 hours even if cold-weather conditions do not officially exist due to high volatility in ambient temperatures.

2) Protection Deficiency: If the temperature requirements during any portion of the protection period are not met but the concrete surface did not freeze, the protection period shall be extended until twice the deficiency expressed in degree-hours is made up. Deficiency degree-hours are defined as the average deficiency in temperature below the required value times the number of hours the deficiency persisted. Make-up degree hours are the average increase in temperature above the minimum value times the hours required to make up twice the deficiency degree-hours. Contact the Architect/Engineer if the concrete surface was allowed to freeze during the protection period.

3) Protection Removal: As the protection is being removed the decrease in temperature measured at the surface of the concrete in a 24 hour period shall not exceed the following:

   a) 50º F for sections less than 12 inches in the least dimension.
   b) 40º F for sections 12 to 36 inches in the least dimension.
   c) 30º F for sections 36 to 72 inches in the least dimension.
   d) 20º F for sections greater than 72 inches in the least dimension.

4) The maximum concrete temperature heated by artificial means at point of placement shall not exceed 90°F.

c. Records: Under cold weather conditions, the Contractor shall keep records of outside air temperature, concrete temperature as placed and general weather conditions. The temperature record shall be taken no less than two times per 24 hour duration.

d. Cold Weather Concreting Requirements: The following items, all or in part as required, should be followed to assure acceptable concrete in cold weather conditions:

1) Design the concrete mixture to obtain high early strength by using higher cement content, a high early strength cement (Type III), or a specified non-chloride accelerator (ASTM C494 Type C or E).
2) Protect the concrete during curing period using insulating blankets, insulated forms, enclosures, and/or heaters.
3) Concrete cured in heated enclosures shall have heaters vented to prevent exposure of concrete and workmen to noxious gases.
4) Frozen subgrade shall be thawed prior to concrete placement and snow and ice shall be removed from forms.
5) Temperature of embedments in concrete must be heated to above 32°F prior to placing concrete
6) Heat the mixing water and then blend hot and cold water to obtain concrete no more than 10°F above the required temperature.
7) Heat the aggregates by circulating steam in pipes placed in the storage bins for air temperatures consistently below 32°F. When either water or aggregate is heated to over 140°F, combine them in the mixer first to obtain a maximum temperature of the mixture not to exceed 140°F in order to prevent flash set of the concrete.
8) Uniformly thaw aggregates far in advance of batching to prevent moisture variations in the stockpile.
9) Cover warmed stockpiles with tarps to retain heat.
10) Place air entraining admixture in the batch after the water temperature has been reduced by mixing with cooler solid materials.
11) Use wind screens to protect concrete from rapid cooling.
12) Place vertical pump lines inside the building, if possible, for concrete being pumped.
13) Maintain artificial heat as low as possible to reduce temperature stresses during cooling.

14) Avoid water curing of concrete except for parking garage structures. Apply the required curing compound to unformed surfaces as soon as possible to prevent drying of concrete from heated enclosures.
15) Delay form stripping as long as possible to help prevent drying from heated enclosures and to reduce damage to formed surfaces caused by premature stripping.
16) Provide triple thickness of insulating materials at corners and edges vulnerable to freezing.
17) Wrap protruding reinforcing bars with insulation to avoid heat drain from the warm concrete.
18) Gradually reduce the heat at the end of the heating period to reduce likelihood of thermal shock.

12. MISCELLANEOUS CONCRETE ITEMS

a. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

b. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

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

13. INVESTIGATION OF LOW CONCRETE STRENGTH TEST RESULTS

a. Contractor Responsibility for Low Strength Concrete:

1) If the average of any three consecutive strength tests falls below the required f'c for a class of concrete but no individual strength test is more than 500 PSI below the required f'c, the Contractor shall immediately notify the Engineer by telephone or email and take immediate steps to increase the average of subsequent strength tests.
2) If any individual strength test falls more than 500 PSI below the required f'c, the Contractor shall immediately notify the Engineer by telephone or e-mail and take immediate steps to assure that the load-carrying capacity of the structure is not jeopardized.

b. Additional Field Tests to Confirm Low Concrete Strengths:

1) The cost of all investigations of low-strength concrete, as defined by any individual strength test being more than 500 PSI below the required f'c, shall be borne by the Contractor.
2) Code-Prescribed Acceptance: The only accepted field-test methods of determining actual in-situ concrete strength is by the way of core tests as prescribed by ACI 318.
3) Non-Destructive Tests: If any individual strength test falls more than 500 PSI below the required f'c, the Engineer may request that non-destructive field tests be performed on the concrete in question using Swiss Hammer, Windsor Probe, or other appropriate methods as approved by the Engineer. Report the comparative test results of the suspect concrete under consideration with identical tests done on concrete of known strength and of the same class. The Engineer considers these test results as only approximate indicators of strength and may not necessarily, by themselves, resolve the low concrete strength issue. These

test results will be considered as additional information by which to make an informed judgment. The Engineer reserves the right to accept the concrete based on the results of these approximate tests or order that core tests be taken as prescribed below. At the Contractor's option, the approximate non-destructive field-tests may be waived and core tests immediately initiated.

4) Core Tests: If, in the opinion of the Engineer, the likelihood of low-strength concrete is confirmed and it has been determined that the load-carrying capacity of the structure is significantly reduced as a result, the Engineer may request that core tests be taken from the area in question as directed by the Engineer. There shall be a minimum of three cores taken for each strength test more than 500 PSI below the required f'c in accordance with ASTM C42. If concrete in the structure will be dry under service conditions, cores shall be air dried (temperature 60° to 80°F, relative humidity less than 60 percent) for seven days before test and shall be tested dry. If concrete in the structure will be more than superficially wet under service conditions, cores shall be immersed in water for at least 40 hours and tested wet. The Contractor shall fill all holes made by drilling cores with an approved drypack concrete.

5) Acceptance Criteria for Core Test: Concrete in an area represented by core tests shall be considered adequate if the average of three cores is equal to at least 85% of the required f'c and no single core is less than 75% of the required f'c. If approved by the Engineer, locations of erratic core strengths may be retested to check testing accuracy.

6) Load Test: If the concrete strength is not considered adequate based on core tests and the structural adequacy remains in doubt, the Engineer may order a load test as specified in ACI 318 be conducted for the questionable portion of the structure.

7) Strengthening or Demolition of the Structure: If the structural adequacy of the affected portion of the structure remains in doubt following the load test, the Engineer may order the structure to be strengthened by an appropriate means or demolished and rebuilt at the Contractor's expense.

14. CONCRETE SURFACE REPAIRS

a. Defective Areas:

1) Formed Surfaces: Concrete surfaces requiring repairs shall include all cracks in excess of 0.016" in width and any other defects that affect the durability or structural integrity of the concrete. Voids, including honeycombing and rock pockets, and tie holes shall be repaired as required by the specified Surface Finish.

2) Unformed Surfaces: Concrete surfaces requiring repair shall include all surface defects such as crazing, cracks in excess of 0.016" in width or cracks that penetrate to reinforcement or through the member, popouts, spalling, and honeycombs.

b. Classification:

1) Structural Concrete Repair: Major defective areas in concrete members that are load carrying, are highly stressed, and are vital to the structural integrity of the structure shall require structural repairs. Structural concrete repairs shall be made using a two-part epoxy bonder, epoxy mortar, or specified polymer repair mortar. The Engineer shall determine the locations of required structural concrete repairs.

2) Cosmetic Concrete Repair: Defective areas in concrete members that are non-load carrying and minor defective areas in load carrying concrete members shall require cosmetic concrete repair when exposed to view and not covered up by architectural finishes. Cosmetic concrete repairs may be made using a polymer repair mortar and compatible bonding agent. The Architect/Engineer shall determine the locations of required cosmetic

concrete repairs. Stains and other discolorations that cannot be removed by cleaning and are exposed to view will require cosmetic repair. Cosmetic concrete repair in exposed-to-view surfaces will require Architect's approval prior to patching operation.

3) Slab Repairs: High and low areas in concrete slabs shall be repaired by removing and replacing defective slab areas unless an alternate method, such as grinding and/or filling with self-leveling underlayment compound or repair mortar is approved by the Architect/Engineer. Repair of slab spalls and other surface defects shall be made using epoxy products as specified above and as determined by the Engineer. The high strength flowing repair mortar may be used for areas greater than one inch in depth.

15. FIELD QUALITY CONTROL

a. Field Testing: The following tests shall be completed by the Testing Laboratory:

1) During Concrete Placement:

a) Record the amount of water added and note if it exceeds the amount allowed to be added shown in the approved design mixture.
b) Mold concrete test cylinders as specified below in "Concrete Test Cylinders" Paragraph below.
c) Perform tests to determine slump, concrete temperature, unit weight, and air entrainment as specified below.
d) Record information for concrete test reports as specified below.
e) Pick up and transport to Laboratory cylinders cast the previous day.

2) After Concrete Placement:

a) In-situ Concrete Strength Verification for Form Stripping: The Testing Laboratory shall perform the tests necessary to determine the concrete strength prior to form stripping.

b) Investigation of Low Strength Concrete Test Results:

(1) Cost of Investigations for Low Strength Concrete: The Contractor shall reimburse the Owner for the costs of investigations of low strength concrete.
(2) Scope of Investigations: See above for the investigations that may be required by the Engineer. The Testing Laboratory will conduct these investigations if required.

c) Post-Installed Anchors in Concrete:

(1) Verify maximum anchor tightening torque for all applicable post-installed anchors.
(2) Provide pull tests on individual anchors as specified in the ICC Evaluation Services Report, on the drawings, or as directed by the Engineer-of-Record.

d) Testing of Non-Shrink Grout for Base Plates and Bearing Plates:

(1) Compressive Strength Tests: Compressive strength of grout shall be determined by testing grout cubes according to the requirements of ASTM C109 – Modified. Test one set of three cubes at one day, and one set of three cubes at 28 days.

(2) Frequency of Testing: One set of cubes (six cubes) shall be made for every ten base plates and bearing plates or fraction thereof but not less than one set for each day's operation. One set of cubes shall be made for each day's operation of grouting wall panels.

3) Standards for Concrete Tests:

a) Concrete Test Cylinders: Mold and test concrete cylinders as described below:

(1) Cylinder Molding and Testing: Cylinders for strength tests shall be molded and Laboratory cured in accordance with ASTM C31 and tested in accordance with ASTM C39. Cylinders may be either 6" in diameter by 12" or 4" in diameter by 8", however, the diameter of the cylinder shall be at least three times the nominal maximum size of the coarse aggregate in the mix tested. All of the cylinders for each class of concrete shall be of the same dimension for all sets of that class.

(2) Field Samples: Field samples for strength tests shall be taken in accordance with ASTM C172 at the point of placement.

(3) Quantity of Cylinders: Each set of test cylinders shall consist of a minimum of four standard 6" diameter cylinders or five standard 4" diameter test cylinders. The Contractor shall reimburse the Owner for the cost of making and testing any additional cylinders.

(4) Frequency of Testing: A set of test cylinders shall be made according to the following minimum frequency guidelines:

One set for each class of concrete taken not less than once a day.
Mat Foundation: One set for each 150 cubic yards or fraction thereof.
Drilled Piers: One set for each 50 cubic yards or fraction thereof.
Grade Beams: One set for each 50 cubic yards or fraction thereof.
Basement Walls: One set for each 150 cubic yards.
Floor Slabs: One set for each 150 cubic yards or fraction thereof but not less than one set for each 5,000 square foot of floor area.
All Other Concrete: A minimum of one set for each 150 cubic yards or fraction thereof.
No more than one set of cylinders at a time shall be made from any single truck.
If the total volume of concrete is such that the frequency of testing as specified above would provide less than five strength tests for a given class of concrete, tests shall be made from at least five randomly selected batches or from each batch if fewer than five batches are used.
The above frequencies assume that one batch plant will be used for each pour. If more than one batch plant is used, the frequencies cited above shall apply for each plant used.

(5) The cylinders shall be numbered, dated, and the point of concrete placement in the building recorded.

(6) For concrete specified on the drawings to reach the required strength at 28 days, break one cylinder of the set at seven days, two 6" by 12" cylinders or three 4" by 8" cylinders at 28 days, and keep one in reserve for testing at the Engineer's direction.

(7) For concrete specified on the drawings to reach the required strength at 56 days, break one cylinder of the set at seven days, one cylinder at 28 days,

two 6" by 12" cylinders or three 4" by 8" cylinders at 56 days, and one kept in reserve for testing at the Engineer's direction.

(8) Cylinder Storage Box: The Contractor shall be responsible for providing a protected concrete cylinder wooden storage box at a point on the job site mutually agreeable with the Testing Laboratory for the purpose of storing concrete cylinders until they are transported to the Laboratory. The box shall be constructed and equipped to maintain the environment specified for initial curing in ASTM C31.

(9) Transporting Cylinders: The Testing Laboratory shall be responsible for transporting the cylinders to the Laboratory in a protected environment such that no damage or ill effect will occur to the concrete cylinders including loss of moisture, freezing temperatures or jarring.

(10) Information on Concrete Test Reports: The Testing Laboratory shall make and distribute concrete test reports after each job cylinder is broken. Such reports shall contain the following information:

Truck number and ticket number.
Concrete Batch Plant.
Design mixture number.
Accurate location of pour in the structure.
Strength requirement.
Date cylinders made and broken.
Technician making cylinders.
Concrete temperature at placing.
Air temperature at point of placement in the structure.
Amount of water added to the truck at the batch plant and at the site and whether or not it exceeds the amount allowed by the design mixture.
Slump.
Unit weight.
Air content.
Cylinder compressive strengths with type of failure if concrete does not meet Specification requirements. Seven day breaks are to be flagged if they are less than 60% of the required 28 day strength. 28 day breaks are to be brought to the attention of the Architect and Engineer in writing if either cylinder fails to meet specification requirements.

b) Slump Tests: Slump Tests (ASTM C143) shall be completed at the beginning of concrete placement for each batch plant and for each set of test cylinders made. The slump test shall be made from concrete taken from the end of the concrete truck chute. The concrete shall be considered acceptable if the slump is within the slump tolerance noted in the approved design mixture submittal for that class of concrete.

c) Concrete Temperature: Concrete temperature at placement shall be measured (ASTM C1064) at the same time slump tests are made as cited above.

4) Evaluation and Acceptance of Concrete:

a) Strength Test: A strength test shall be defined as the average strength of two six inch cylinder breaks or three four inch cylinder breaks from each set of cylinders tested at the time indicated above.

b) Acceptance Criteria: The strength level of an individual class of concrete shall be considered satisfactory if both of the following requirements are met:

(1) The average of all sets of three consecutive strength tests equal or exceed the required f'c.
(2) No individual strength test falls below the required f'c by more than the greater of 10% of f'c or 500 PSI.

c) If either of the above Acceptance Criteria requirements is not met, the Testing Laboratory shall immediately notify the Engineer by telephone. Steps shall immediately be taken to increase the average of subsequent strength tests.

5) Testing Reports: Compressive strength, slump, air, and temperature tests shall be identified by reference to a particular trip ticket.

b. Field Inspection: The scope of the work to be performed by the inspector on the jobsite shall be as follows:

1) Before Concrete Placement:

a) Inspect concrete formwork per Specification 031000 "Concrete Forming and Accessories."
b) Inspect concrete reinforcing per Specification 032000 "Concrete Reinforcing."
c) Inspect bolts and rods to be embedded in concrete for proper grade, size, length, and embedment.
d) For slabs-on-grade, verify that the moisture retarder is provided, is lapped properly, and is not torn or punctured.
e) Verify that there is no standing water in pour area and that all debris has been removed from the area and from the formwork.
f) Verify that openings and sleeves in slabs or walls are correct size and location. Verify that the openings are shown on the structural drawings and notify the Engineer immediately of any openings in the field that are not shown on the drawings.
g) Verify that horizontal and vertical sleeves through grade beams or walls have been approved by the Engineer and that approved reinforcement is provided.

2) During Concrete Placement: Provide continuous monitoring to:

a) Upon arrival of concrete, inspect the concrete to verify that the proper concrete mix number, type of concrete, concrete strength is being placed at the proper location. Verify that the mix meets the project specifications and is not over 90 minutes old at the time of placement. Report concrete not meeting the specified requirements and immediately notify the Contractor, Batch Plant Inspector, Architect, Engineer, and Owner.
b) Inspect plastic concrete upon arrival at the jobsite to verify proper batching. Observe mix consistency and adding of water as required to achieve target slumps in design mixtures.
c) Verify that the Contractor is following appropriate Hot Weather or Cold Weather concreting practices consistent with any extreme environmental conditions at the point of placement in the structure.
d) Verify that concrete deposited is uniform and that vertical drop does not exceed six feet and is not permitted to drop freely over reinforcement causing segregation.
e) Verify that the formwork has remained stable during the concreting operation.
f) Verify that there are no cold joints.
g) Verify that the concrete is properly vibrated.
h) Inspect bolts embedded in concrete during concrete placement for verification that they have been properly installed to the specified embedment.

i) Verify that the finishing of the concrete surface is done according to specifications.

3) After Concrete Placement:

a) Verify that the curing process is according to Specifications and that any curing compound used is applied in accordance with the manufacturer's recommendations.

b) Verify that sawcut control joints in slab-on-grades are cut within 12 hours of placement.

c) Post-Installed Anchors in Concrete: Provide inspection of post-installed anchor installations at the frequency noted in the specifications and in accordance with the published, currently valid, Evaluation Service Report (ESR) for each anchor product. Post-installed anchors include anchors and reinforcing steel. Inspection of post-installed anchors shall include but not be limited to the following:

(1) Periodic Inspection: Verify initial installation of post-installed anchors in concrete for each individual installer with each individual anchor product in accordance with the requirements stated below for each type of anchor. Periodically inspect anchor installation after the initial verification.

(2) Continuous Inspection: Verify each installation of post-installed anchors in concrete in accordance with the requirements stated below for each type of anchor.

(3) All Post-Installed Anchors: Verify that the anchor is installed in accordance with manufacturer's printed installation instructions as well as the following design requirements.

Concrete type, concrete strength and concrete thickness are in accordance with design drawings.
Anchor manufacturer and product, including material, is in accordance with design drawings or approved substitution.
Anchor diameter, length and installed embedment depth.
Drill bit type and diameter.
Anchor edge distance and spacing.
Hole diameter and depth.
Hole cleaning procedure and cleanliness.
Anchor maximum tightening torque.

(4) Adhesive Anchors: In addition to the requirements for All Post-Installed Anchors, verify adhesive identification and expiration date.

4) The Testing Laboratory shall report any irregularities that occur in the concrete at the job site or test results to the Contractor, Architect, Owner, and Engineer.

END OF SECTION

SECTION 03 53 00

CONCRETE TOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Emery-aggregate concrete floor topping.
2. Iron-aggregate concrete floor topping.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 CONCRETE FLOOR TOPPINGS

A. Emery-Aggregate Concrete Floor Topping: Factory-prepared and dry-packaged mixture of graded, crushed emery aggregate containing not less than 50 percent aluminum oxide, not less than 24 percent ferric oxide, and not more than 8 percent silica; portland cement or blended hydraulic cement; plasticizers; and other admixtures to which only water needs to be added at Project site.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Anti-Hydro International, Inc.
   b. Dayton Superior.
   c. L&M Construction Chemicals, Inc.
   d. Metalcrete Industries.
   e. US Concrete Materials, LLC.

2. Compressive Strength (28 Days): 10,000 psi, ASTM C 109/C 109M.

2.2 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, 25 percent solids content, minimum.

2.3 RELATED MATERIALS

A. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids epoxy resin with a Type A Shore durometer hardness of 80 according to ASTM D 2240.

B. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

C. Portland Cement: ASTM C 150/C 150M, Type I or II.

D. Sand: ASTM C 404, fine aggregate passing No. 16 sieve.

E. Water: Potable.

F. Acrylic-Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

G. Epoxy Adhesive: ASTM C 881/C 881M, Type V, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements.

2.4 MIXING

A. Bonding Slurry: Mix portland cement with water to a thick paint consistency.

B. Bonding Slurry: Mix 1 part portland cement and 1-1/2 parts sand with water and an acrylic-bonding agent according to manufacturer's written instructions to a thick paint consistency.

C. Floor Topping: Mix concrete floor topping materials and water in appropriate drum-type batch machine mixer or truck mixer according to manufacturer's written instructions.

PART 3 - EXECUTION

3.1 PREPARATION

A. Existing Concrete: Remove existing surface treatments and deteriorated and unsound concrete. Mechanically abrade base slabs to produce a heavily scarified surface profile with an amplitude of 1/4 inch.

1. Prepare and clean existing base slabs according to concrete floor topping manufacturer's written instructions. Fill voids, cracks, and cavities in base slabs.
2. Saw cut contraction and construction joints in existing concrete to a depth of 1/2 inch and fill with semirigid joint filler.

3. To both sides of joint edges and at perimeter of existing base slab, install concrete nails in manufacturer's recommended staggered pattern.

B. Install joint-filler strips where topping abuts vertical surfaces.

3.2 FLOOR TOPPING APPLICATION

A. Start floor topping application in presence of manufacturer's technical representative.

B. Monolithic Floor Topping: After textured-float finish is applied to fresh concrete of base slabs specified in Section 033000 "Cast-in-Place Concrete," place concrete floor topping while concrete is still plastic.

C. Deferred Floor Topping: Within 72 hours of placing base slabs, mix and scrub bonding slurry into dampened concrete to a thickness of 1/16 to 1/8 inch, without puddling. Place floor topping while slurry is still tacky.

D. Existing Concrete: Apply epoxy-bonding adhesive, mixed according to manufacturer's written instructions, and scrub into dry base slabs to a thickness of 1/16 to 1/8 inch, without puddling. Place floor topping while adhesive is still tacky.

E. Place concrete floor topping continuously in a single layer, tamping and consolidating to achieve tight contact with bonding surface. Do not permit cold joints or seams to develop within pour strip.

1. Screed surface with a straightedge and strike off to correct elevations.
2. Slope surfaces uniformly where indicated.
3. Begin initial floating, using bull floats to form a uniform and open-textured surface plane free of humps or hollows.

F. Finishing: Consolidate surface with power-driven floats as soon as concrete floor topping can support equipment and operator. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until concrete floor topping surface has a uniform, smooth, granular texture.

1. Hard Trowel Finish: After floating surface, apply first trowel finish and consolidate concrete floor topping by power-driven trowel without allowing blisters to develop. Continue troweling passes and restraighten until surface is smooth and uniform in texture.

G. Construction Joints: Construct joints true to line with faces perpendicular to surface plane of concrete floor topping, at locations indicated or as approved by Architect.

1. Coat face of construction joint with epoxy adhesive at locations where concrete floor topping is placed against hardened or partially hardened concrete floor topping.

H. Contraction Joints: Form weakened-plane contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete floor topping when cutting action will not tear, abrade, or otherwise damage surface and before random contraction cracks develop.

1. Form joints in concrete floor topping over contraction joints in base slabs unless otherwise indicated.

2. Construct contraction joints for a combined depth equal to topping thickness and not less than one-fourth of base-slab thickness.
3. Construct contraction joints for a depth equal to one-half of concrete floor topping thickness, but not less than 1/2 inch deep.

3.3 PROTECTING AND CURING

A. General: Protect freshly placed concrete floor topping from premature drying and excessive cold or hot temperatures.

B. Evaporation Retarder: Apply evaporation retarder to concrete floor topping surfaces in hot, dry, or windy conditions before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying floor topping, but before float finishing.

C. Begin curing immediately after finishing concrete floor topping. Cure by one or a combination of the following methods, according to concrete floor topping manufacturer's written instructions:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for not less than seven days.
3. Curing Compound: Apply uniformly in two coats in continuous operations by power spray or roller according to manufacturer's written instructions.

3.4 JOINT FILLING

A. Prepare and clean contraction joints and install semirigid joint filler, according to manufacturer's written instructions, once topping has fully cured.

B. Install semirigid joint filler full depth of contraction joints. Overfill joint and trim semirigid joint filler flush with top of joint after hardening.

3.5 REPAIR

A. Defective Topping: Repair and patch defective concrete floor topping areas, including areas that have not bonded to concrete substrate.

END OF SECTION

DIVISION 6

WOOD, PLASTICS AND COMPOSITES

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SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Framing with engineered wood products.
3. Shear wall & roof panels.
4. Rooftop equipment bases and support curbs.
5. Wood blocking, cants, and nailers.
6. Wood furring.
7. Wood sleepers.
8. Plywood backing panels.

B. Related Requirements:

1. Section 06 20 13 Exterior Finish Carpentry

1.2 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

1.3 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Fire-retardant-treated wood.
3. Engineered wood products.
4. Shear panels.
5. Power-driven fasteners.
6. Powder-actuated fasteners.
7. Expansion anchors.
8. Metal framing anchors.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Provide dressed lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: **19 percent at time of installation, 16 percent at loading and 15 percent at close-in**, unless otherwise indicated.

C. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, **furring**, and similar concealed members.
3. Wood floor plates that are installed over roof deck.

2.3 DIMENSION LUMBER FRAMING

A. Framing - minimum grades UON:

1. Posts and beams 4x and larger: DF No. 1.
2. Joists, rafters, plates and 2x6 studs: DF No. 2
3. 2x4 studs, construction grade beams and posts to be free of heart center (FOHC). "Framing Other Than Non-Load-Bearing Interior Partitions" Paragraph below is an example of a performance requirement that can be used instead of "Framing Other Than Non-Load-Bearing Interior Partitions" Paragraph above.

B. Exposed Framing: Provide material hand-selected for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane.

1. Application: Exposed exterior.
2. Species and Grade: As indicated above for load-bearing construction of same type.

2.4 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.
6. Grounds.

B. For items of dimension lumber size, provide Construction or No. 2 grade lumber of any species.

2.5 PLYWOOD SHEATHING

A. Structural Plywood shall conform to PSI-07, stamped and graded by APA with exterior glue 5/8" min.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Power-Driven Fasteners: NES NER-272.

C. Bolts: Steel bolts complying with ASTM A 307, Grade A hex nuts and, where indicated, flat washers.

2.7 METAL FRAMING ANCHORS

A. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those of products of manufacturers listed. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A 653/A 653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.

1. Use for wood-preservative-treated lumber and where indicated.

2.8 MISCELLANEOUS MATERIALS

A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

D. Install fire-retardant treated plywood backing panels with classification marking of testing agency exposed to view.

E. Shear Wall Panels: Install shear wall panels to comply with manufacturer's written instructions.

F. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

G. Do not splice structural members between supports unless otherwise indicated.

H. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

I. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

J. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.

3.2 PROTECTION

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

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes sufficiently wet that moisture content exceeds that specified, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

DIVISION 7

THERMAL AND MOISTURE PROTECTION

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SECTION 07 14 80

ROOFING UNDERLAYMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section describes the requirements for furnishing and installing roofing underlayment.

B. Related Sections: The completion of the work described in this Section may require work in or coordination with other Sections of these specifications. The Contractor and the sub-contractor shall be responsible for identifying and including all related work in other Sections of these specifications and/or drawings necessary for a complete installation of the work described in this Section. These related Sections include but are not limited to the following:

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

2. Section 07 60 00 - Flashing and Sheet Metal

1.02 SUBMITTALS

A. Manufacturer's product data, installation instructions, details and product sample.

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Self-adhesive membrane roofing underlayment shall be manufactured and marketed by a firm with a minimum of 20 years experience in the production and sales of self-adhered membrane roofing underlayment.

1.04 DELIVERY, STORAGE AND HANDLING

A. The membrane and accessory products must be handled properly. Read all product labels and Material Safety Data Sheets (MSDS's) for proper handling and disposal. Deliver all materials in manufacturer's unopened packages and store all materials under cover. Do not double stack palletized material.

1.05 JOB CONDITIONS

A. Apply underlayment in fair weather at temperatures of 40°F and above.

B. Provide adequate ventilation of enclosed spaces where primer is used.

C. Apply roof covering material promptly at temperatures of 40°F and above.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS AND PRODUCTS

A. High Temperature Underlayment: W. R. Grace & Co. - Conn., Grace Construction Products, Cambridge, MA , "Ultra" or approved equal.

2.02 MATERIALS

A. Standard Underlayment: Self-adhesive roofing membrane composed of glass fleece reinforcement and SBS modified bitumen. Face covered with a release film with top face lightly sanded.

1. Thickness: 60-mils minimum.

2. Breaking Strength: 54/91 lb/in., ASTM D5147.

3. Ultimate Elongation: 4/4%, ASTM D5147.

4. Static Puncture: 22.5-lb., ASTM D5602.

5. Peel Resistance on Concrete and Plywood: 16-lb./in., ASTM D903.

6. Peel Strength: 5.7-lb/in., ASTM D903.

7. Water Vapor Permeance: <0.1, ASTM E96.

8. Low Temperature Flexibility: -31-deg. F., ASTM D1970.

B. High Temperature Underlayment: Ultra is a cold-applied, self-adhering membrane composed of a high density, cross laminated polyethylene film coated on one side with a layer of butyl rubber adhesive. An embossed, slip resistant surface is provided on the polyethylene. Ultra is interwound with a disposable silicone-coated release sheet. Membrane shall conform to the following physical properties:

1. Color: Gray-Black.

2. Membrane Thickness: 0.76 mm (30 mil), ASTM D 3767 Method A.

3. Membrane Tensile Strength: 1720 kN/m^2 (250 psi), ASTM D 412 (Die C Modified).

4. Membrane Elongation: 250%, ASTM D 412 (Die C Modified).

5. Low Temperature Flexibility: Unaffected @ -29°C (-20°F), ASTM D 1970.

6. Adhesion to Plywood: 525 N/m (3.0 lb/in. width), ASTM D 903.

7. Permeance (Maximum): 2.9 ng/m^2s Pa (0.05 Perms), ASTM E 96.

8. Material Weight Installed (Maximum): 1.1 kg/m^2 (0.22 lb/ft^2), ASTM D 461.

PART 3 - EXECUTION

3.01 PREPARATION

A. Install the membrane directly on a clean, dry, continuous structural deck. Some suitable deck materials include plywood, wood composition, wood plank, metal, concrete, or gypsum sheathing. Remove dust, dirt, loose nails, and old roofing materials. Protrusions from the deck area must be removed. Decks shall have no voids, damaged, or unsupported areas. Repair deck areas before installing the membrane.

3.02 INSTALLATION

A. Install underlayment in strict accordance with manufacturer's printed application procedures, precautions and limitations.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Counterflashing.
   2. Formed roof-drainage sheet metal fabrications.

B. Related Sections: The completion of the work described in this Section may require work in or coordination with other Sections of these specifications. The Contractor and the sub-contractor shall be responsible for identifying and including all related work in other Sections of these specifications and/or drawings necessary for a complete installation of the work described in this Section. These related Sections include but are not limited to the following:

   1. Joint Sealants not specified herein: Section 07 92 00
   2. Finish Painting not specified herein: Section 09 91 00

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For sheet metal flashing and trim.

   1. Include plans, elevations, sections, and attachment details.
   2. Distinguish between shop- and field-assembled work.
   3. Include identification of finish for each item.
   4. Include pattern of seams and details of termination points, expansion joints and expansion-joint covers, direction of expansion, roof-penetration flashing, and connections to adjoining work.

C. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Product test reports.

C. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1.7 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

1. Wind Uplift: Conform to UL 580-Class 90 and ASTM E1592.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 (Z275) coating designation] [or] [aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation, Grade 40 (Grade 275)];

2.3 UNDERLAYMENT MATERIALS

A. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.

B. Synthetic Underlayment: Laminated or reinforced, woven polyethylene or polypropylene, synthetic roofing underlayment; bitumen free; slip resistant; suitable for high temperatures over 220 deg F (111 deg C); and complying with physical requirements of ASTM D 226/D 226M for Type I and Type II felts.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Atlas Roofing Corporation; Summit.
b. Engineered Coated Products; Nova-Seal II.

c. Kirsch Building Products, LLC; Sharkskin Comp
d. SDP Advanced Polymer Products Inc; Palisade.
e. Approved equal.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for [Zinc-Coated (Galvanized)] [Aluminum-Zinc Alloy-Coated] Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329.

C. Solder:
1. For Zinc-Coated (Galvanized) Steel: ASTM B 32, [Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead] [with maximum lead content of 0.2 percent].

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Obtain field measurements for accurate fit before shop fabrication.
2. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.

3. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
2. Use lapped expansion joints only where indicated on Drawings.

C. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

E. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.

F. Seams: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.

2.6 ROOF SHEET METAL FABRICATIONS

A. Base Flashing: Fabricate from the following materials:
1. Galvanized Steel: 0.028 inch (0.71 mm) thick.

B. Counterflashing: Fabricate from the following materials:
1. Galvanized Steel: 0.022 inch (0.56 mm) thick.

C. Roof-Penetration Flashing: Fabricate from the following materials:
1. Galvanized Steel: 0.028 inch (0.71 mm) thick.

D. Drip Edges: Fabricate from the following materials:
1. Galvanized Steel: 0.022 inch (0.56 mm) thick. (Painted in field)
2. Factory Kynar Finished: Galvanized Steel, 0.022 inch (0.56 mm) thick.

E. Eave, Rake, Ridge: Fabricate from the following materials:
1. Galvanized Steel: 0.022 inch (0.56 mm) thick. (Painted in field)
2. Factory Kynar Finished: Galvanized Steel, 0.022 inch (0.56 mm) thick.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

A. Felt Underlayment: Install felt underlayment, wrinkle free, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).

B. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective

coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of uncoated-aluminum and sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.

D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches (38 mm); however, reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder metallic-coated steel sheet.
2. Do not use torches for soldering.
3. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

3.3 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate.

C. Copings: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints minimum of 4 inches (100 mm).

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric or butyl sealant and clamp flashing to pipes that penetrate roof.

3.4 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Opening Flashings in Frame Construction: Install continuous head, sill, jamb and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.5 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.

END OF SECTION

SECTION 07 92 00

SEALANTS AND CAULKING

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Throughout the Work, seal and caulk joints where shown on the Drawings and elsewhere as required to provide a positive barrier against passage of moisture, fire/smoke, and passage of air.

B. Related work: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.

1.02 RELATED SECTIONS

A. The completion of the work described in this Section may require work in or coordination with other Sections of these specifications. The Contractor and the sub-contractor shall be responsible for identifying and including all related work in other Sections of these specifications and/or drawings necessary for a complete installation of the work described in this Section. These related Sections include but are not limited to the following:

1. Section 07 62 00 – Sheet Metal Flashing and Trim
2. Section 09 91 00 – Painting not specified herein.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

1.04 SUBMITTALS

A. Product data: Within 15 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items proposed to be provided under this Section;
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;

B. Samples: Accompanying the submittal described above, submit Samples of each sealant, each backing material, each primer, and each bond breaker proposed to be used.

1.05 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 60 00.

B. Do not retain at the job site material which has exceeded the shelf life recommended by its manufacturer.

PART 2 - PRODUCTS

2.01 SEALANTS

A. Provide sealant as manufactured by Tremco, Sika, Pecora or approved equal. Products approved by the Architect. Sealant products shall be, but not necessarily limited to, the following types:

1. Non-skinning Butyl: Tremco JS-773, Sika 511, Pecora BR-96
2. Horizontal surfaces: Tremco Dymonic, Sika 201, Pecora Dynatoral I-XL.

B. Colors:

1. Colors for each sealant installation will be selected by the Architect from standard colors normally available from the specified manufacturers.
2. Should such standard color not be available from the approved manufacturer except at additional charge, provide such colors at no additional cost to the Owner.

C. In concealed installations, and in partially exposed installations, use standard gray or black sealant.

2.02 PRIMERS

A. Use only those primers which are nonstaining, have been tested for durability on the surfaces to be sealed, and are specifically recommended for this installation by the manufacturer of the sealant used.

2.03 BACKUP MATERIALS

A. Use only those backup materials which are specifically recommended for this installation by the manufacturer of the sealant used, which are nonabsorbent, and which are nonstaining.

B. Acceptable types include:
   1. Closed-cell resilient urethane or polyvinylchloride foam;
   2. Closed-cell polyethylene foam;
   3. Closed-cell sponge of vinyl or rubber;
   4. Polychloroprene tubes or beads;
   5. Polyisobutylene extrusions;
   6. Oil-less dry jute.

2.04 BOND-PREVENTATIVE MATERIALS

A. Use only one of the following as best suited for the application, and as recommended by the manufacturer of the sealant used:

   1. Polyethylene tape, pressure-sensitive adhesive, with the adhesive required only to hold tape to the construction materials as indicated;
   2. Aluminum foil complying with MIL-A-148E;
   3. Wax paper complying with Fed Spec UU-P-270.

2.05 MASKING TAPE

A. For masking around joints, provide masking tape complying with Fed Spec UU-T-106c.

2.06 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the review of the Architect.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Steel surfaces:
   1. Steel surfaces in contact with sealant:
      a. Sandblast as required to achieve acceptable surface for bond.
      b. If sandblasting is not practical, or would damage adjacent finish, scrape the metal or wire brush to remove mill scale.
      c. Use solvent to remove oil and grease, wiping the surfaces with clean rags.
   2. Remove protective coatings on steel by sandblasting or by using a solvent, which leaves no residue.

B. Aluminum surfaces:
   1. Aluminum surfaces in contact with sealant:
      a. Remove temporary protective coatings, dirt, oil, and grease.
      b. When masking tape is used for protective cover, remove the tape just prior to applying the sealant.
   2. Use only such solvents to remove protective coatings as are recommended for that purpose by the manufacturer of the aluminum work, and which are nonstaining.

3.03 INSTALLATION OF BACKUP MATERIAL

A. Use only the backup material recommended by the manufacturer of the sealant used for the particular installation, compressing the backup material 25% to 50% to achieve a positive and secure fit.

B. When using backup of tube or rod stock, avoid lengthwise stretching of the material. Do not twist or braid hose or rod backup stock.

3.04 PRIMING

A. Use only the primer recommended by the manufacturer of the sealant, for the particular installation, applying in strict accordance with the manufacturer's recommendations.

3.05 BOND-BREAKER INSTALLATION

A. Provide a bond-breaker where recommended by the manufacturer of the sealant, adhering strictly to the installation recommendations.

3.06 INSTALLATION OF SEALANTS

A. Prior to start of installation in each joint, verify the joint type according to details on the Drawings, and verify that the required proportion of width of joint to depth of joint has been secured.

B. Equipment:

1. Apply sealant under pressure with power-actuated or hand gun, or by other appropriate means.
2. Use guns with nozzle of proper size, and providing sufficient pressure to completely fill the joints as designed.

C. Thoroughly and completely mask joints where the appearance of sealant on adjacent surfaces would be objectionable.

D. Install the sealant in strict accordance with the manufacturer's recommendations, thoroughly filling joints to the recommended depth.

E. Tool joints to the profile shown on the Drawings, or as otherwise required if such profiles are not shown on the Drawings.

F. Cleaning up:

1. Except at aluminum surfaces (see 3.2-C above), remove masking tape immediately after joints have been tooled.
2. Clean adjacent surfaces free from sealant as the installation progresses, using solvent or cleaning agent recommended by the manufacturer of the sealant used.

END OF SECTION

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DIVISION 8

OPENINGS

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SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: All finish hardware required to complete the work as indicated on the drawings and as specified herein.

B. Related Sections/Work Specified Elsewhere

1. Section 06 10 00 – Carpentry
6. Section 10 14 00 – Interior Signage

1.02 REFERENCES

A. CBC - California Building Code-2013 edition (Part 2, Title 24, C.C.R.)

B. ADA – Americans with Disabilities Act

C. NFPA 101 Life Safety Code – 2012 edition (National Fire Protection Association)

D. NFPA 80 – Standard for Fire Doors and Fire Windows – 2013 edition (National Fire Protection Association)

E. ANSI A156.1 through A156.20 – American National Standards Institute hardware standards as Applicable

F. U.L. – Underwriters Laboratories, Inc.

G. BHMA – Builders Hardware Manufacturers Association

H. DHI – Door and Hardware Institute – "Keying Systems and Nomenclature" and mounting heights/locations procedures and standards

1.03 SUBMITTALS

A. Submit in accordance per CSU Contract General Conditions of Job Order Contracting, 6.04 Shop Drawings, Samples, Alternatives or Equal, Substitutions.

B. Hardware Schedule: No later than (30) days following Notice of Award, submit a complete schedule of hardware to the Architect for review. Schedule criteria:

1. Schedule shall be in Door and Hardware Institute (DHI) vertical format only. Horizontal door/hardware schedules will not be accepted.
2. Include index of doors listing door number, page and heading number for each door listed.
3. Include a legend of abbreviations, symbols, finishes and manufacturers.
4. Each hardware item scheduled shall be listed by quantity, type, manufacturer's model number, size/handing as applicable, screws/fasteners, finish, manufacturer and any additional information required for proper installation/operation.
5. List hardware for each door in groups, referencing the same group numbers and numerical group sequence as specified in HARDWARE SCHEDULE.
6. Include in each hardware group/heading, the door number/location, door and frame types, material, size, thickness, fire rating and any additional door and frame information required for proper installation/operation of hardware.
7. Review and approval of the hardware schedule by the Architect does not absolve Contractor of responsibility for missing and/or incorrect items.

8. If requested, the hardware supplier shall furnish to the University/Architect copies of purchase orders showing the dates hardware orders were placed.

C. Product Data: Include catalog cut sheets on each type of hardware scheduled to include pictures/drawings, specifications and/or data sheets.

D. Samples: Furnish, when directed by the Architect, a physical sample of each specified item of hardware.

1. A physical sample of hardware shall always be furnished with submission of each substitution request.
2. Samples shall be returned upon request. Cost of samples shall be the responsibility of Contractor.

E. Templates: Furnish templates or physical hardware for all hardware manufactured to template to the door and frame manufacturers/suppliers for their use in preparing doors and frames for specified hardware.

F. Keying Schedule: Within ten (10) days after approval of the hardware submittal, Contractor shall have a keying conference with the University/Architect to determine the specific keying requirements of the project. A formal keying schedule shall be prepared based upon the information from the meeting and submitted to the University/Architect for approval.

H. Operations and Maintenance Data: At contract closeout, furnish to the Owner one (1) copy of an Owners Operation and Maintenance Manual. The manual shall consist of a hard cover, three ring binder with the manual's title and project name listed on the outside, front cover. The manual shall include:

1. Maintenance data for each item of hardware
2. Manufacturer's installation instructions for each hardware item
3. Name, address and phone number of the local representative of each mfr.
4. Parts list for each product
5. Copy of final hardware schedule to include all items listed in 1.03 SUBMITTALS, B., C. and G.
6. Copy of final keying schedule

1.04 QUALITY ASSURANCE/REGULATORY REQUIREMENTS

A. Substitutions: Furnish manufacturers of products as listed in 2.01 MANUFACTURERS. Substitution requests shall be made only in writing and no later than ten (10) days prior to bid opening. Substitutions will not be allowed after the bid. 1.03, D. Samples shall pertain.

B. Supplier Qualifications: Hardware supplier shall be a recognized finish hardware supplier, regularly engaged in contracting work who has been furnishing projects of this size and scope in the project's vicinity for a period of not less than five (5) years. The firm must have warehousing facilities and a sufficient staff to accommodate a project of this size. The supplier must have in his employ a certified Architectural Hardware Consultant (AHC) or a member of Door and Hardware Institute (DHI) with equivalent qualifications who is available at reasonable times during the course of the project for consultation with the Owner, Architect and Contractor. The supplier shall be an authorized factory distributor of the key system specified.

C. Installer Qualifications: Hardware installer shall have at least two (2) years experience in installing all types of finish hardware with specific experience in hardware installation on a project of this type and scope.

1.05 DELIVERY, STORAGE AND HANDLING

A. Marking and Packaging: Each hardware item shall be packaged individually in manufacturer's original box/package. Mark all packages with respective door, room, hardware heading and hardware set number.

B. Delivery: Deliver all hardware to jobsite unless otherwise directed by Contractor or specified

herein.

C. Storage: Store all hardware in a dry, secured, enclosed area that is not subject to any corrosive elements that could damage the operation or appearance of the product.

1.06 WARRANTY

A. Product Warranties:

1. Locksets: (2) years
2. Exit Devices: (5) years
3. Surface Closers: Minimum (25) years
4. Continuous Hinges: (10) years

5. Remaining hardware shall be warranted for a minimum period of (2) years. The manufacturer's specific product warranty, if greater than (2) years, shall take precedence.

B. The manufacturer's product warranty shall commence from date of substantial completion. Defects in materials and workmanship occurring during the warranty period shall be corrected to the complete satisfaction of the Architect and University. Re-installation of defective product during the warranty period shall be the responsibility of the manufacturer.

C. Submit manufacturer's warranty for each product in duplicate to Owner at contract closeout.

1.07 MAINTENANCE

A. Tools: Furnish to Owner at contract closeout, any special tools required for maintenance, removal and/or replacement of finish hardware.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Provide finish hardware as follows: Where "As Specified" is designated there is no substitution. Furnish only the specified manufacturer. Refer to 1.04, A. for substitutions.

HARDWARE ITEM	SPECIFIED MANUFACTURER		APPROVED EQUALS
Hinges - Butts	BOM	Bommer	None
Locks, Latches, Cylinders	COR	Corbin Russwin	None
Surface Closers	NOR	Norton	None
Exit Devices	PRE	Precision	None
Thresholds, Sweeps, Seals	PEM	Pemko	None

2.02 MATERIALS

A. Screws and Fasteners: Install all hardware only with screws and fasteners furnished with hardware.

1. Where a specific type of hardware is packaged by the manufacturer with "screws and fasteners by others", install hardware with manufacturer's recommended type(s).
2. Finish to match hardware.

B. Hinges (butts): Unless otherwise specified in the HARDWARE SCHEDULE, furnish 4.5 x 4.5, full mortise, template type butts with non-rising loose pins. Furnish Bommer as specified or approved equal as listed in 2.01, A.

1. Furnish 5 x 4.5 size for doors 3'1" and wider.
2. Furnish three hinges for doors less that 7'6" tall and four hinges for doors 7'6" tall and greater.
3. Exterior doors: Furnish out-swinging door hinges in non-ferrous material with stainless steel, Non Removable Pin (NRP).

4. Interior doors: Furnish wrought steel, polished and plated to match specified finish of other hardware.
5. Furnish hinges of sufficient width, where required to clear frame and trim, to allow door to open 180 degrees.

C. Locks: Except where otherwise specified all locksets, latchsets and component parts shall be by one manufacturer. Furnish Best 93K series, "14C" design cylindrical locksets as specified or approved equal listed in 2.01, A.

1. Locksets and cylinders shall have Best 7-pin, "patented" keyway, interchangeable cores or equal.
2. Lever design shall comply with applicable California Reference Code requiring levers to return to within ½" of the face of door.
3. Locks shall be furnished with ¾" throw latch bolts as required.
4. Furnish strikes as required by frame types with extended lips where required to protect trim from being marred by latch bolt.
5. Prior to Owner occupancy of the building, the Contractor and the Owner's representative, together, shall remove construction master keyed cores and install permanent cores.

D. Closers:

1. Surface Closers: Surface mounted closers shall meet ANSI A156.4 Grade 1 Standard and shall be full rack and pinion type with cast iron or pressure cast aluminum alloy shell. Furnish Dorma as specified or approved equal as listed in 2.01, A.

a. Closers shall be non-handed and allow a 180-degree door opening.
b. Furnish molded plastic full covers as standard with optional full metal covers furnished where specified.
c. Furnish drop plates, back plates, brackets, mortise shoes and long arms as required.
d. All parallel arm closers shall be furnished with a heavy-duty forearm (SPA).
e. All closers shall be multi-size, power adjustable type with independent latch speed, sweep speed, back check cushioning and back check positioning valve controls. Furnish delayed action option and slide track arms where specified.
f. Closers shall comply with ANSI A117.1 and ADA accessibility requirements for maximum allowable opening force to open a door as follows:

1) Fire doors shall have the minimum opening force allowable by the appropriate authority having jurisdiction.
2) Interior non-fire rated doors - 5 lbs.
3) Exterior doors - 8.5 lbs.

E. Silencers: For steel frames without seals, furnish push-in type silencers. Self-adhesive type is not permissible. Furnish silencers as follows:

1. Pairs of doors: 2 each
2. Single doors: 3 each

F. Miscellaneous Hardware: Furnish remaining hardware items as specified in the HARDWARE SCHEDULE. The manufacturers' and model numbers listed establish design, function and quality requirements.

2.03 FINISHES

A. The finish of all hardware shall be as specified in the HARDWARE SCHEDULE. BHMA designation indicates base metal as well as finish.

2.04 KEYING

A. Refer to 1.03, F. Keying Schedules for requirements for preparation of specific keying schedule.

B. Key all locksets, cylinders and padlocks as follows:

1. Master key/grand master key as required
2. Construction master key

C. All locks shall be factory keyed only.

D. Furnish the following keys and related items:

1. (2) blanks and (2) change per keyed different lock
2. (2) each keyed alike set
3. (2) masters each MK set
4. (2) grand masters
6. (2) interchangeable core control
9. (1) bitting list

F. All permanent keys shall be tagged with door and hardware heading number and shall be delivered to Owner via registered mail or in person.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, examine doors, frames and related items for defects or other conditions that would prevent the proper application of finish hardware.

B. Verify that power source is available at point of use to operate electrified hardware.

C. Do not proceed with hardware installation until defects are corrected.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions.

B. Surface Closers: Mount all closers inside rooms, in stairwells and inside vestibules. Do not mount closers in corridors except at exterior doors that open off a corridor. On fire rated, mineral core wood doors and hollow core wood doors, install closers with sex nuts and bolts. Template closers for maximum degree of opening with 90 degree minimum. Adjust closers to comply with reduced opening force, accessibility requirements per 2.02, F., f.

C. Seals: As required, notch jamb seals around hardware items (closer arms, strikes, etc.).

D. Unless otherwise specified, all hardware mounting heights shall be per Door and Hardware Institute (DHI) mounting location standards. Operating trim, auxiliary lock devices or pull mounting heights shall not exceed 44" as measured from finish floor to center line of hardware.

3.03 FIELD QUALITY CONTROL

A. After hardware installation has been completed, an inspection of work shall be conducted by the Architect, Contract Administrator and/or project inspector to determine the proper application of hardware in accordance with the approved hardware and keying schedules. Check that all locks and cylinders are properly keyed and that the operation and adjustment of all hardware items are correct.

3.04 ADJUSTING AND CLEANING

A. At end of project, clean and make final adjustments to all hardware. Where hardware is found defective, repair, replace or otherwise correct as directed.

3.05 PROTECTION

A. Proper care and protection for all hardware items and finishes shall be provided until completion of project.

3.06 HARDWARE SCHEDULE

A. The following is a Schedule of Hardware to be furnished for this work. The material listed shall conform throughout with the requirements of the foregoing Specifications.

Bathroom Door
Each Door to Have

1	Latchset	CL3370	613	COR
1	Set Seals	S88		PEM

Exterior Door
Each Door to Have

1	Lever Set	4900A	628	PRE
1	Set Seals	S88		PEM
1	Exit Device	Apex 2100	628	PRE

END OF SECTION

DIVISION 9

FINISHES

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SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.01 SUMMARY

A. This Section describes the requirements for furnishing and installing gypsum board and associated accessories.

B. Related Sections: The completion of the work described in this Section may require work in or coordination with other Sections of these specifications. The Contractor and the sub-contractor shall be responsible for identifying and including all related work in other Sections of these specifications and/or drawings necessary for a complete installation of the work described in this Section. These related Sections include but are not limited to the following:

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

2. Section 09 90 00 - Painting

1.02 SUBMITTALS

A. Product Data: Manufacturer's specifications and installation instructions for each type of gypsum wallboard and accessory required.

B. Manufacturer's Qualifications: Provide documentation that the manufacturer meets the specified qualifications.

1.03 QUALITY CONTROL

A. Manufacturer's Qualifications: Gypsum wallboard, including accessories and fasteners, shall be the products of the same manufacturer.

B. Gypsum wallboard work shall comply with ASTM C840, and the IBC unless otherwise indicated or specified.

C. Installation and finishing of gypsum wallboard shall comply with GA-216.

D. Fire-Resistance Ratings: Where gypsum wallboard systems with fire-resistance ratings are indicated, provide materials and installations identical with those of applicable assemblies tested in accordance with ASTM E119 by fire testing laboratories acceptable to authorities having jurisdiction.

1. Provide fire-resistance-rated assemblies identical to those indicated by reference to GA File No's. in GA-600 "Fire Resistance Design Manual" or to design designations in UL "Fire Resistance Directory" or in listing of other testing and agencies acceptable to authorities having jurisdiction.

E. Allowable Tolerances:

1. Gypsum wallboard surfaces shall have no measurable variation in any 2 foot direction and a maximum variation of 1/8" in 10 feet when a straightedge is laid on the surface in any direction. Specified tolerances apply to both plumbness of walls and levelness of ceilings.

2. Shim work as required to comply with specified tolerances.

3. Do not exceed 1/16" offset between planes of abutting sheets at edges or ends.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. Deliver materials to the Project site in original package containers or bundles with manufacturer's labels intact and legible.

2. Deliver fire-rated materials bearing the testing agency's label and classification identification.

B. Storage:

1. Store materials indoors in a dry area, under cover, and stacked flat off the floor.

2. Stack wallboard so that long lengths are not over short lengths.

C. Handle wallboard to avoid damaging face and edges of sheets.

D. Protect metal corner beads and trim from being bent or damaged.

1.05 PROJECT CONDITIONS

A. Establish and maintain environmental conditions for application and finishing gypsum board to comply with ASTM C840 and with gypsum board manufacturer's recommendations.

B. Minimum Room Temperatures: For nonadhesive attachment of gypsum board to framing, maintain not less than 40°F. For adhesive attachment and finishing of gypsum board, maintain not less than 50°F for 48-hours prior to application and continuously thereafter until drying is complete.

C. Ventilate building spaces to remove water not required for drying joint treatment materials. Avoid drafts during dry, hot weather to prevent materials from drying too rapidly.

D. Provide for continuous ventilation during installation, using as close to 100% outside air as possible.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS

A. Georgia-Pacific Corp., Gold Bond Building Products, Div., National Gypsum, United States Gypsum or approved equal.

2.02 GYPSUM BOARD PRODUCTS

A. Gypsum Wallboard: ASTM C36, Type X, 5/8"-thick, with tapered and wrapped long edges.

B. Moisture-Resistant Gypsum Board: ASTM C630, Type X, 5/8"-thick, with tapered and wrapped long edges. Provide for exposed and concealed locations at walls of toilet rooms, janitor rooms, and other wet spaces; do not use on ceilings.

C. Glass Mat-Faced Gypsum Sheathing: ASTM C79, 1/2"-thick Georgia Pacific DensGlass Gold Exterior Guard, or approved equal.

2.03 GYPSUM BOARD ACCESSORIES

A. High Build Spray-Applied Primer/Surfacer: USG Sheetrock Brand "Tuff-Hide" or approved equal.

B. Screws: ASTM C954 or ASTM C1002.

1. Use Type S screws for gypsum board attachment to light steel framing.

2. Use Type S-12 screws for gypsum board attachment to 20-gauge and heavier steel framing.

3. Use Type G screws for gypsum board attachment to gypsum board.

C. Metal Trim:

1. Corner Bead: Fine-mesh expanded-steel wing type, zinc coated in conformance with ASTM A643, G40 coating designation.

2. Control Joint: Steel, perforated-flange wing type, with single bead, zinc coated in conformance with ASTM A643, G40 coating designation.

3. Edge Trim: Fine-mesh expanded-steel flange, zinc coated in conformance with ASTM A643, G40 coating designation.

D. Reveals:

1. 1/2" Reveal Mounting: Fry Reglet DRM-625-50 or approved equal.

2. "F" Reveal Molding, 1/2": DRMF-625-50 or approved equal.

E. Joint-Treatment Materials: ASTM C475.

1. Joint Tape: Paper reinforcing tape.

2. Joint Compound: Ready mixed, all-purpose; one grade for bedding tapes and filling depressions, one for second and third coats.

3. Water-Resistant Joint Compound: Use special joint compound to treat joints and cut edges of moisture-resistant gypsum wallboard.

PART 3 - EXECUTION

3.01 INSPECTION

A. Verify that conditions are satisfactory for the installation of gypsum wallboard and accessories.

1. Check framing for accurate spacing, alignment, plumbness, and levelness. Verify that both new and existing framing members will result in gypsum wallboard surfaces complying with specified tolerances.

2. Verify spacing of installed framing does not exceed maximum allowable for thickness of wallboard to be used.

3. Verify door frames are set for thickness of wallboard to be used.

4. Repair protrusions of framing, twisted framing members, or unaligned members before installation of wallboard commences.

B. Do not commence the installation until unsatisfactory conditions have been corrected.

3.02 APPLICATION OF GYPSUM BOARD PRODUCTS

A. Apply materials in conformance with ASTM C840 and ASTM C79, the manufacturer's instructions, and as indicated. Gypsum board is not to be applied to exterior ceilings, soffits or sills.

B. When gypsum board is to be applied to both walls and ceilings, apply to ceilings first.

C. For partitions, apply sheets with long dimension perpendicular to framing members with abutting ends over supports. Where ceiling heights exceed 8'-1" and where required by fire resistive ratings, apply sheets with long dimension parallel to framing members. For ceilings, apply sheets with long dimension either perpendicular or parallel to framing members to result in fewest joints.

D. Use sheets of maximum lengths to minimize end joints.

E. Neatly fit and stagger end joints.

F. Locate joints on different studs at opposite sides of partition.

G. Cut and fit neatly around outlets and switches. Back-to-back wall penetrations shall be at least two stud spaces apart for acoustic insulation.

H. Double-Layer Application:

1. Apply base layer with long dimension parallel to and centered on framing; apply face layer perpendicular to framing. Apply face layer parallel to framing where required by fire-resistive ratings.

2. Stagger sheets of each layer so that joints of each layer are 16" apart.

I. Apply gypsum wallboard to curved framing by dampening paper face or scoring approximately 1" on center. Moisten face and back paper and allow water to soak into core where bending radii require.

J. Isolation of Gypsum Board Products from Other Construction:

1. Provide perimeter relief where wallboard abuts structural decks, ceilings, vertical structural elements, or window sections.

2. Gypsum sheathing should be spaced not less than 1/4" from abutting masonry to minimize wicking.

3. Finish wallboard edge with metal casing bead.

4. Seal space between casing bead and structure with continuous sealant bead.

5. Seal around electrical boxes and conduit and pipe penetrations.

6. Seal at base of wallboard sheets.

K. Acoustic Control Requirements for Sound Walls:

1. Leave a 1/8" to 1/4" space between gypsum wallboard and adjacent construction to provide a space for acoustical sealant.

2. Seal airtight with acoustical sealant material specified in Section 07 90 00.

3. Seal penetrations through walls, or cuts in one face of walls, with a full bead of sealant at perimeter; this includes provisions for electrical outlet and switch boxes, pipes, ducts, and similar items.

4. Seal electrical boxes at the back with specified sheet sealant pad. Where wires enter the boxes, seal the openings airtight around the wires and knockout openings.

L. Installation of Fasteners:

1. Do not locate fasteners less than 3/8" from edges or ends of sheets. Do not locate fasteners less than one" from edges or ends in horizontal applications.

2. Fire-Rated Partitions: Install fasteners in accordance with UBC Table 7-B.

3. Non-Fire-Rated Partitions: Install fasteners in accordance with UBC Table 25-G.

4. Fire-Rated Ceilings: Install fasteners in accordance with UBC Table 7-C and Gypsum Association "Fire-Resistance Design Manual."

5. Non-Fire-Rated Ceilings: Install fasteners spaced not more than 12" on center for screws, 7" for nails.

6. Install screws using powered screw guns with adjustable screw-depth control head. Drive shank perpendicular to wallboard surface. Do not hammer screws.

7. Set fastener heads slightly below surface of wallboard, but do not break or strip paper face around fastener.

8. Stagger fasteners opposite each other on adjacent ends and edges.

9. Omit fasteners at edges where metal edge trim will be installed.

M. Installation of Accessories:

1. Install corner trim at vertical and horizontal external corners and angles, and edge trim at junctions of wallboard and other materials and at exposed edges.

2. Control Joints:

a. Ceilings: Maximum area for ceilings with perimeter relief shall be 2,500-sq. ft.; maximum area for ceilings without perimeter relief shall be 900-sq. ft. Do not exceed 50-feet

between control joints in ceilings with perimeter relief; 30-feet between control joints in ceilings without perimeter relief.

b. Walls and Partitions: Maximum spacing between control joints shall not exceed 30-feet.

3.03 TAPING AND FINISHING

A. Finish Levels: Unless otherwise scheduled, required finish levels for various areas shall be as follows:

1. In areas of temporary construction, no taping or accessories are required.

2. In plenum areas above ceilings, attics, electrical closets, and other areas not normally exposed to the public, joints and interior angles shall have tape embedded in joint compound. Surfaces shall be free of excess joint compound. Tool marks and ridges are acceptable.

3. Where water-resistant gypsum backing board is used as a substrate for tile, joints and interior angles shall have tape embedded in joint compound and one separate coat of joint compound applied over joints, angles, fastener heads, and accessories. Surface shall be free of excess joint compound. Tool marks and ridges not affecting the installation of tile are acceptable.

4. On surfaces to receive eggshell, semigloss, or gloss paints, and surfaces subject to severe or critical natural or artificial side lighting, joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over joints, angles, fastener heads, and accessories. Level 5 smooth finish. The finish application shall be a consistent texture as determined by the Owner. The surface shall be free of tool marks and ridges.

5. Unless otherwise specified in another finish level, joints and interior angles shall have tape embedded in joint compound and two separate coats of joint compound applied over joints, angles, fastener heads, and accessories. Joint compound shall be smooth and free of tool marks and ridges.

B. Mix joint finishing compounds in accordance with manufacturer's directions.

C. Joints:

1. Center tape over joint and embed in uniform layer of joint compound of sufficient width and depth to provide firm and complete bond. Apply skim coat while embedding tape.

a. Treat angles with reinforcing tape folded to conform to adjacent surfaces and straight, true angles.

2. Apply finishing compound over taped joints. Apply number of coats specified for each finish level.

a. Spread first coat evenly and feather out beyond joint center approximately 3-1/2".

b. After first coat is dry, sand or smooth to eliminate any high spots or excessive compound and cover with second coat with edges feathered out approximately 6" from center of joint. After second coat is dry, lightly sand with fine sandpaper or wipe with a damp sponge to leave a smooth even surface. When sanding, exercise caution not to raise nap of the gypsum board paper.

D. Give dimples at fastener heads and marred spots on surface of wallboard one coat of joint compound and two coats of finishing compound, applied in same manner specified for joints.

E. Cut edges and openings around pipes and fixtures shall be caulked flush with sanitary sealant as specified in Section 07 90 00.

F. Install metal corner accessories at external corners.

1. Conceal flanges of metal accessories with a minimum of two coats of compound.

2. Extend compound 8" to 10" each side of accessories.

G. In the completed installation, wallboard shall have plumb and straight surfaces with no waves or buckles. Joints, fastener heads, and trim flanges shall be invisible after finishing. Surfaces shall be uniformly smooth and ready for painting or other decoration.

3.04 PROTECTION OF FINISHED WORK

A. Maintain temperature and humidity conditions as required to protect the installation.

B. Protect completed wallboard from damage or deterioration until final acceptance of the Work.

END OF SECTION

SECTION 09 65 00

RESILIENT FLOORING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work included: Provide resilient flooring where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:
   1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division I of these Specifications.

1.02 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

1.03 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 24.

B. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:
   1. Materials list of items proposed to be provided under this Section;
   2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;
   3. Samples of each item, color, and pattern available in the specified grades from the proposed manufacturers.
   4. Provide a seam diagram to the Architect for review. The diagram shall show all proposed seams, direction of pattern, and width of material.

1.04 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01 60 00.

1.05 EXTRA STOCK

A. Deliver to the Owner for his use in future modifications an extra stock of approximately 5% of each color and pattern in each material installed under this Section, packaging each type of material separately, distinctly marked, and adequately protected against deterioration.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

A. Provide colors and patterns as selected by the Architect from standard colors and patterns of the approved manufacturer in the specified type.

B. Adhesives:
   1. Provide waterproof and stabilized type adhesive as recommended by the manufacturer of the material being installed.
   2. Asphalt emulsions and other nonwaterproof adhesives will not be acceptable.

C. Concrete slab primer: Provide nonstaining type as required and as recommended by the manufacturer of the material being installed.

D. New resilient sheet flooring shall not be placed over existing flooring. Existing flooring shall be removed. Patch and fill existing sub-flooring to a smooth even finish prior to installation.

2.02 RESILIENT MATERIALS

A. Resilient Sheet Flooring:
1. Provide Armstrong – Braxton 11 - Toffee.

B. Cement:
1. Shall be the same manufacturer as the floor material and shall be as recommended by the manufacturer for the type of flooring being used.

C. Floor Patch and Leveling Compound:
1. Floor patch and leveling compound shall be products manufactured specifically for the purpose, as recommended by the manufacturer of the particular flooring being furnished.

D. For sealing joints between the top of wall base or integral cove cap and irregular wall surfaces such as masonry, provide plastic filler applied according to the manufacturer's recommendations.

E. Edging Strips and Transitions:
1. Aluminum Transition Strips.

F. Seam Cement:
1. Shall be epoxy welded with a product recommended by the approved manufacturer.

2.03 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the review of the Architect.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. Subfloors:
1. Verify that substrate is smooth, level, at required finish elevation, and without more than 1/8" in 10'-0" variation from level or slopes shown on the Drawings.
2. Prior to laying materials, broom clean or vacuum the surfaces to be covered, and inspect the subfloors.

B. Concrete Slab Waterproofing:
1. Concrete waterproofing shall be installed as described in Section 07100.

C. Priming:
1. Apply concrete slab primer if so recommended by the resilient flooring manufacturer.
2. Apply in accordance with the manufacturer's recommendations.

3.03 TESTING FOR MOISTURE

A. A. Procedure for moisture testing may vary with the conditions of a particular installation. Test methods shall be only acceptable to the resilient flooring manufacturer. Refer to Section 07100 for testing methods required.

3.04 INSTALLATION

A. General:
   1. Install materials only after finishing operations, including painting, have been completed and after permanent heating system is operating.
   2. Verify that moisture content of concrete slabs, building air temperature, and relative humidity are within the limits recommended by the manufacturers of the materials used.
   3. Maintain reference markers, holes, and openings that are in place or plainly marked for future cutting by repeating on the finish surface as marked in the subfloor. Use chalk or other nonpermanent marking device.

B. Materials and Adhesives:
   1. Keep at a temperature of 70 degrees F. - or higher for at least forty eight (48) hours before using, and maintain 70 degrees or higher room temperatures at least three (3) days before, during and after application of materials. Apply all materials in strict accordance with the manufacturer's installation instructions. Materials shall be installed only by skilled and experienced applicators authorized and approved by the manufacturer.

C. Sheet Flooring:
   1. Install flooring in accordance with the manufacturer's written instructions.
   2. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.
   3. If required, install flooring on pan-type floor access covers. Maintain continuity of color and pattern within pieces of flooring installed on these covers. Adhere flooring to the subfloor around covers and to covers.
   4. Scribe, cut, and fit or flash cove to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets.
   5. Adhere flooring to the subfloor without cracks, voids, raising and puckering at the seems. Roll with a 100-pound (45.36) kilogram) roller in the field areas. Hand-roll flooring at the perimeter and the seams to assure adhesion. Refer to specific rolling instructions of the flooring manufacturer.
   6. Lay flooring to provide a minimum number of seams. Avoid cross seams, filler pieces, and strips. Match edges for color shading and pattern at the seams in compliance with manufacturer's recommendations.
   7. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.
   8. Use methods and sequence of work in conformance with written instructions of the flooring manufacturer. Finish all seams flush and free from voids, recesses, and raised areas.

D. Installation of accessories:
   1. Apply top set wall base to walls, columns, casework, and other permanent fixtures in areas where top-set base is required. Install base in lengths as long as practical, with inside corners fabricated from base materials that are mitered or coped. Tightly bond base to vertical substrate with continuous contact at horizontal and vertical surfaces.
   2. Fill voids with plastic filler along the top edge of the resilient wall base or integral cove cap on masonry surfaces or other similar irregular substrates.
   3. Place resilient edge strips tightly butted to flooring, and secure with adhesive recommended by the edge strip manufacturer. Install edge strips at edges of flooring that would otherwise be exposed.

E. Base:
   1. 6" Intragal cove base.

3.05 BONDING

A. Coordinate with other trades on use of form release agents or concrete sealers that will prevent proper adhesion of resilient floor material.

3.06 CLEANING AND PROTECTING

A. Remove excess adhesive and other blemishes from exposed surfaces, using neutral cleaner recommended by the manufacturer of the resilient materials.

B. Perform initial maintenance according to the flooring manufacturer's instructions.

C. Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades or the placement of fixtures and furnishings.

END OF SECTION

SECTION 09 77 00
SPECIAL WALL SURFACING

PART 1: GENERAL

1.01 Summary

A. Section Includes: Durable, decorative wall panels with smooth or textured finishes. Mounting hardware, adhesives, accessories and trims.

B. Related Sections:

1. Division 06 Section: Rough Carpentry.
2. Division 09 Section: Gypsum Board Assemblies.

1.02 References

A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to the extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.

B. ASTM International:

1. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM D256 Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
3. ASTM D638 Standard Test Method for Tensile Properties of Plastics.
4. ASTM D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
5. ASTM D2583 Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.

1.03 System Description

A. Performance Requirements: Provide durable, decorative wall panels which have been manufactured and installed to maintain performance criteria stated by manufacturer without defects, damage or failure.

1.04 Submittals

A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 01300 Submittal Procedures Section.

B. Product Data: Submit manufacturer's product data, storage, handling and preparation requirements and installation instructions.

C. Shop Drawings: Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors, patterns and textures. Indicate location and dimension of joints and fastener attachment.

D. Samples: Submit selection and verification samples for finishes, colors and textures. Submit 2 samples of each type of panel, trim and fastener.

General: Firm experienced in successful production of wall system similar to that indicated for the Project. Quality Assurance/Control Submittals: Submit the following:

1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
2. Certificates:
    a. Submit manufacturer's certificate that products meet or exceed specified requirements.
    b. Submit certificate of installer's qualifications.

3. Manufacturer's Instructions: Manufacturer's installation instructions.

1. Closeout Submittals: Submit the following:Operations and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 01 Closeout Submittals (Maintenance Data and Operation Data) Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.
2. Warranty documents specified herein.

1.05 Quality Assurance

A. Installer Qualifications: Installer shall have a minimum of 5 years experience with composite wall panel work similar in scope and size to this project.

B. Regulatory Requirements and Approvals: [Specify applicable requirements of regulatory agencies.].

1.06 Delivery, Storage & Handling

A. General: Comply with Division 01 Product Requirements Section.

B. Lead Time: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

D. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
    1. Store panels indoors.
    2. Lay panels flat. Do not stand panels on edge.
    3. Protect panels from moisture.
    4. Do not store panels in contact with the floor or against an outside wall.
    5. Do not remove protective film from panel surface until after installation (if applicable).
    6. Maintain optimum storage conditions of 60-75 degrees F (16-24 degrees C) at 35 - 55% relative humidity. Avoid extremes in temperature and humidity.

E. Handling: Remove foreign matter from face of panel by using a soft bristle brush, avoiding abrasive action.

1.07 Project/Site Conditions

A. Environmental Requirements:
    1. Installation shall not begin until building is enclosed, permanent heating and cooling equipment is in operation and residual moisture from plaster, concrete or

terrazzo work has dissipated.

2. Install panels between 60 degrees F - 75 degrees F (15 - 24 degrees C) and relative humidity below 55%, ideally at the same conditions as the room's normal operating temperatures after building is occupied.
3. Provide ventilation to disperse fumes during application of adhesive as recommended by adhesive manufacturer.
4. Do not install wall system until normal lighting conditions exist. Normal lighting conditions are described as those in place when the project is finished.

B. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.08 Wall, ceilings, floors and openings must be level, plumb, straight, in-line and square Warranty

A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.

C. Warranty Period: 1 year commencing on Date of Substantial Completion.

1. Warranty extends to products assembled / installed and used in the manner intended and does not cover damage or failure caused by: misuse, abuse or accidents, exposure to extreme temperature, improper installation, improper maintenance and exposure to water or excessive humidity or excessive moisture.

1.09 Maintenance

A. Extra Materials: Provide A recommended percentage of additional material for use by owner in building maintenance and repair.

PART 2: PRODUCTS

2.01 Composite Wall Panels

A. Manufacturer: Nudo

1. Contact: 1500 Taylor Avenue, Springfield, IL 62703; Telephone: (800) 826-4132, (217) 528-5636; Fax: (217) 528-8722; E-mail: info@nudo.com ; website: www.nudo.com

B. Products/Systems: Composite wall & ceiling panels, including the following: FiberLite® FRP Wall Panels:

FiberLite: Fiberglass Reinforced Plastic (FRP) panel or equal.

Texture: Pebbled

High Pressure Laminate (HPL): NA
Thickness: 0.090"

Fire-Rating Class: [C], [A]

Color: Medium Gray (1207)

Size: as indicated on drawings.

Physical Properties:

1) Flexural Strength (ASTM D790): -- psi
2) Flexural Modulus (ASTM D790): -- psi.
3) Tensile Strength (ASTM D638): -- psi.
4) Barcol Hardness (ASTM D2583): --
5) Izod Impact (ASTM D256): -- ft-lb/in.
6) Surface Burning Characteristics (ASTM E84):

2.02 Accessories

Moldings: Specify color as available for product.

PART 3: EXECUTION

3.01 Manufacturer's Instructions

A. Adhesive: Provide panel adhesive as recommended by panel manufacturer.

B. Trim and Seam Treatment:

1. Manufacturer: Acceptable to panel manufacturer.
2. Manufacturer Designation: manufacturer designation.
3. Material and Color: Color matched acrylic latex caulk.
4. Material and Color: Aluminum moldings

C. Fasteners: Provide appropriate fasteners and accessories as required to properly complete installation.

3.03 Preparation

A. Comply with the instructions and recommendations of the durable, decorative wall panel manufacturer.

Site Verification of Conditions: Verify substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions. Verify that site conditions are acceptable for installation of durable, decorative wall panels. Examine back-up surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails are countersunk and joints and cracks are filled flush and smooth with the adjoining surface. Do not proceed with installation of durable, decorative wall panels until unacceptable conditions are corrected.

3.04 Installation

A. General: Prior to installing panels, remove packaging and allow panels to acclimate to room temperature and humidity for at least 48 hours.

Wall substrate must be dry and free from dirt, dust, grease and other contaminants. Walls must be flat and even. Remove high spots and fill low spots with material acceptable to panel manufacturer.

Remove wallpaper, soluble or loose paint and other foreign matter that might interfere with proper adhesive bond. Painted walls must be prepared to adhesive manufacturer specifications for proper adhesion.

B. General:

Inspect panels for any defects immediately. Do not install panels of unacceptable quality. Field cutting of all wall systems should be accomplished using a circular saw with fine tooth carbide blade.

Position panel so that the saw blade enters the finished HPL side first to avoid chipping or damage. Protect decorative laminate face of panel by covering work area, do not remove protective will until after installation.

Follow adhesive manufacturer's recommendations for appropriate height of adhesive bead left by trowel and do not allow

adhesive to skin over. When interior paneling is on an exterior wall or wet area, provide a barrier sheet and/or follow the adhesive manufacturer's installation recommendations for a secure bond.

C. Installation Using Aluminum Moldings or PVC Trims:

1. Start in the corner. Mark plumb line 48 1/8 inches from corner.
2. Apply adhesive directly to entire back of composite wall panel using correct trowel with 100% adhesive coverage using crosshatch pattern. Apply adhesive to within 1/2 inch of all edges of panel.
3. Slide panel into molding and withdraw [1/8 inch for PVC moldings] [1/16 inch for aluminum moldings] to provide appropriate gap. Align with plumb line.
4. Begin in top corner nearest molding with laminate roller, rolling down and out toward the edge without molding.
5. Continue rolling down and out working across panel away from previously installed panel or initial molding. Remove all trapped air.
6. Install one-piece division bar and caps or next molding by sliding onto panel.
7. Repeat process, working in one direction around room.
8. Immediately remove all adhesive residue. To remove, clean with nonabrasive cotton cloth and warm water. If necessary, use a mild nonabrasive detergent. For cleanup with solvent based adhesives, use mineral spirits or acetone to remove residue.

D. Installation Using Caulk:

1. Plan panel layout so seams are not directly over seams of substrate.
2. Apply adhesive directly to back of composite wall panel with 100% adhesive coverage using crosshatch pattern. Extend adhesive to all edges of panel.
3. Install panel. Place six-penny finishing nails at 1/8 inch (3.2mm) spacing against the panel about 2 feet (610mm) apart to hold panels in place while adhesive sets and provide proper spacing for color caulk. Continue installing panels using this method, leaving nails in place during installation.
4. Remove nails after adhesive sets.
5. Place a narrow piece of masking tape along panel edge from top to bottom, exactly at joint edge. Firmly apply tape to both panels.
6. Fill 1/8 inch (3.2mm) gap between the panels with caulk, making sure gap is completely filled.

7. Tilt caulking tube back from vertical so that tip of tube advances first in direction of travel.
8. Wet finger and smooth bead if necessary.
9. Remove masking tape before bead cures. Clean off excess caulk with damp cloth.
10. Install corner moldings as described in molding instructions.

3.05 Cleaning

A. Clean panel surfaces in compliance with manufacturer's recommendations.

1. Use a clean, damp, nonabrasive cotton cloth and a mild liquid detergent or household cleaner.
2. Rinse with clean water using a clean, nonabrasive cotton cloth.
3. Dry panels with a soft, clean nonabrasive cotton cloth.
4. Do not use cleaners containing acid, alkali or sodium hypochlorite.

3.06 Protection

A. Protect installed work from damage due to subsequent construction activity on the site.

END OF SECTION

SECTION 09 91 00

PAINTING

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section describes the requirements for painting and finishing of exterior exposed items and surfaces.

1. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatments specified in other Sections.

2. Work includes painting exposed pipes and ducts, hangers, exposed steel and iron, and primed metal surfaces of Mechanical and Electrical equipment, and general sheet metal work, except as otherwise indicated or specified.

3. Work includes painting hardware specified as primed (USP or 600).

4. Work includes sanding shop-primed surfaces and applying specified primer and finish coats.

5. "Paint" means coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

B. Surfaces Not to Be Painted:

1. Pre-finished items, including but not limited to fire sprinkler heads, casework, and finished mechanical and electrical equipment, including light fixtures, switchgear and distribution cabinets.

2. Concealed surfaces such as walls or ceilings in concealed areas and inaccessible areas, furred areas, pipe spaces, and duct shafts.

3. Finished metal surfaces such as anodized aluminum, stainless steel, zinc chromium plate, copper, bronze and similar finished materials, and exterior aluminum entrances and storefronts and curtain walls.

4. Prefinished metal materials, flashing, gutters and downspouts.

5. Moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sensing devices, motor and fan shafts.

C. Related Sections: The completion of the work described in this Section may require work in or coordination with other Sections of these specifications. The Contractor and the sub-contractor shall be responsible for identifying and including all related work in other Sections of these specifications and/or drawings necessary for a complete installation of the work described in this Section. These related Sections include but are not limited to the following:

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

2. Shop priming ferrous metal items including structural steel, metal fabrications, hollow metal work and similar items. The work of this Section includes sanding and applying specified primer on all shop-primed surfaces exposed to view in the completed work.

3. Shop priming of fabricated components such as architectural woodwork, wood casework and shop-fabricated or factory-built mechanical and electrical equipment or accessories.

4. Finishing of exposed interior and exterior structural steel items.

D. Do not paint over code-required labels, equipment identification, performance rating, name, or nomenclature plates.

1.02 SUBMITTALS

A. Certification: Furnish certification by the paint manufacturer that products supplied comply with Green Seal recommendations controlling the use of volatile organic compounds (VOCs). Those VOC recommendations for interior paint are 150 g/l for non-flat and 50 g/l/ for flat.

B. Samples: Furnish samples of each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate.

1. Provide stepped samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing samples for review. Resubmit until required sheen, color, and texture are achieved.

2. Furnish samples on the following substrates for review of color and texture only:

a. Painted Wood: Two 12"-square samples of each color and material on hardboard.
b. Stained or Natural Wood: Two 4" x 8" samples of natural and stained wood finish on actual wood samples.

C. Product Data: Specified paint systems are those of Benjamin Moore. If other paint manufacturers are proposed and accepted by the Architect, furnish product comparison charts showing that proposed paint systems are equal to the specified materials in number of coats, type of paint, and sheen.

1.03 QUALITY ASSURANCE

A. Applicators Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent.

B. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use thinners approved by paint manufacturer, and use within recommended limits.

C. Coordination of Work: Review other Sections in which prime paints are to be provided to ensure compatibility of coatings system for various substrates. Upon request, furnish information or characteristics of finish materials to be used.

D. Field-Applied Samples: provide a field application of each color in an area to be determined by the Architect for final color approval by the Architect.

E. Requirements of Regulatory Agencies: Comply with applicable rules and regulations of governing agencies for air quality control.

1. Comply with current applicable regulations of the Environmental Protection Agency (EPA).

2. Regulatory changes may affect the formulation, availability, or use of specified coatings. Confirm availability of coatings to be used prior to start of painting.

F. Field Samples: On exterior surfaces provide full-coat finish samples on at least 100-sq. ft. of surface, as directed by the Architect, until required sheen, color and texture is obtained; simulate finished lighting conditions for review of in-place work. Approved samples will be used as a standard for the Project.
1. Approved samples may be incorporated into work.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name, batch number, color, and directions.

B. Store materials in tightly covered containers. Maintain containers in a clean condition, free of foreign materials and residue.

C. Keep storage area neat and orderly. Remove oily rags and waste daily. Ensure that workers and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

1.05 JOB CONDITIONS

A. Apply water-base paints when temperature of surfaces to be painted and surrounding air temperatures are between 50°F and 90°F, unless otherwise permitted by paint manufacturer's printed instructions.

B. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45°F and 90°F, unless otherwise permitted by paint manufacturer's printed instructions.

C. Do not apply paint in rain, fog or mist, or when relative humidity exceeds 85%, or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.

D. Provide adequate ventilation during interior painting using as close to 100% outside air as possible.

PART 2 - PRODUCTS

2.01 APPROVED MANUFACTURERS

A. Benajmin Moore products are specified as a standard of quality against which the equivalency of other products will be determined by the Architect.

1. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to Frazee, Dunn Edwards, Kelly Moore, Sherwin Williams or approved equal.

2.02 MATERIALS

A. Material Compatibility: Provide block fillers, primers, finish coat materials, and related materials that are compatible with one another and the substrates indicated under conditions of service and application.

B. Material Quality: Provide best quality grade of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.

2.03 COLORS

A. Colors will generally match existing colors as specified by the Architect.

B. Colors of paints, including shades of stain, shall match color samples approved by Architect.

C. Paint colors not scheduled will be selected by Architect.

2.04 PATCHING MATERIALS

A. Wood Patching Compound: Two-part, epoxy-resin patching system; knife-grade formulation as recommended by manufacturer for type of wood repair indicated, tooling time required for the detail of work, and site conditions. Compound shall be designed for filling voids in damaged wood materials that have deteriorated due to weathering and decay. Compound shall be capable of filling deep holes and spreading to feather edge.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Abatron, Inc.; LiquidWood with WoodEpox.
b. Advanced Repair Technology, Inc.; Primatrate with Flex-Tec HV.
c. ConServ Epoxy LLC; Flexible Epoxy Consolidant 100 with Flexible Epoxy Patch 200.
d. Polymeric Systems, Inc.; QuickWood.
e. West System Inc.; West System.
f. Wood Care Systems; ROTFIX with SCULPWOOD.
g. Approved equal.

B. Metal Patching Compound: Two-part, polyester-resin metal patching compound; knife-grade formulation as recommended by manufacturer for type of metal repair indicated, tooling time

required for the detail of work, and site conditions. Compound shall be produced for filling metal that has deteriorated due to corrosion. Filler shall be capable of filling deep holes and spreading to feather edge.

C. Cementitious Patching Compounds: Cementitious patching compounds and repair materials specifically manufactured for surface preparation and sanding of cementitious substrates prior to repainting; formulation as recommended by manufacturer for type of cementitious substrate indicated, exposure to weather and traffic, detail of work, and site conditions.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions under which painting is to be applied. Surfaces receiving paint shall be thoroughly dry before paint is applied.

1. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect prior to applying barrier coats.

2. Clean surfaces before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning.

3. Start of painting will be construed as the applicator's acceptance of surfaces and conditions within a particular area.

3.02 PROTECTION

A. Protection: Protect work of other Sections against damage by painting and finishing work. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

1. Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.

2. Remove or protect hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted, or provide surface-applied protection prior to surface preparation and painting. Following completion of painting, reinstall removed items.

3. At completion of work of other Sections, touch-up and restore damaged or defaced painted surfaces.

3.03 SURFACE PREPARATION

A. Concrete and Interior Masonry: Prepare surfaces to be painted by removing surface contaminates.

1. Remove efflorescence with stiff bristle brush, wire brushing, wiping, sandblasting or acid washing and rinsing. Allow to dry.
2. Remove chalk, dust, dirt, asphalt, tar or excessive mortar by scraping or wire brushing.
3. Remove rust, grease or oil by solvent cleaning or sandblasting.
4. Treat concrete surfaces which are highly glazed or where traces of form release agents are present with a preparation of one-part concentrated muriatic acid, 4-parts water and one-part detergent or as recommended by parting compound manufacturer. Remove acid with water. Allow to dry.
5. Remove stains on concrete resulting from weathering or corroded metals, with a solution of 2-oz. sodium methasilicate in one-gallon water. Wet stained areas with water before application of solution. Allow to dry.

B. Wood: Clean surfaces of dirt, oil, loose paint and other foreign substances with scrapers, mineral spirits, and sandpaper, as required.

1. Remove sheen from previously painted glossy surfaces, if sandpaper is used, dust off surface. Sand new surfaces exposed to view smooth, and dust off surface.

2. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dry.

3. Prime, stain, or seal unpainted wood to be painted immediately upon delivery. Prime edges, ends, faces, undersides, and backsides of wood.

4. When transparent finish is required, backprime with spar varnish.

5. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately upon delivery.

C. Ferrous Metal: Clean ungalvanized ferrous metal surfaces that have not been shop-coated; remove oil, grease, dirt, loose mill scale, loose paint and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council (SSPC).

1. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.

2. Sand shop-applied prime coats to a smooth surface, ready to receive specified primer and finish coats.

D. Galvanized Metals:
1. New - Clean with nonpetroleum-based solvents so that the surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
2. Previously Painted - Clean surfaces of dirt, oil, loose paint and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand all previously painted surfaces and new surfaces exposed to view smooth and dust off.

E. Cement Fiber Exterior Wallboard: Clean surfaces of dirt, oil, loose paint and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand all previously painted surfaces and new surfaces exposed to view smooth and dust off.
1. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dry.

2. Prime, stain, or seal wood to be painted immediately upon delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling.

3.04 SUBSTRATE REPAIR

A. General: Repair substrate surface defects that are inconsistent with the surface appearance of adjacent materials and finishes.

B. Wood Substrate:

1. Repair wood defects including dents and gouges more than 1/4 inch in size and all holes and cracks by filling with wood patching compound and sanding smooth. Repair defects from rot or excessive weathering in window sills, windows sashes and other existing woodwork to be painted.

2. Fill joints between new spliced in wood members and existing.

3. Reset or remove protruding fasteners. Remove hooks or screws protruding from window or door trim. Patch resulting holes.

4. Where existing paint is allowed to remain, sand irregular buildup of paint, runs, and sags to achieve a uniformly smooth surface.

C. Cementitious Material Substrate:

1. General: Repair defects including dents and chips more than 1/2 inch (13 mm) in size and all holes and cracks by filling with cementitious patching compound and sanding smooth. Remove protruding fasteners.

2. New and Bare Plaster: Neutralize surface of plaster with mild acid solution as recommended by paint manufacturer. In lieu of acid neutralization, follow manufacturer's written instruction for primer or transition coat over alkaline plaster surfaces.
3. Concrete, Cement Plaster, and Other Cementitious Products: Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. If surfaces are too alkaline to paint, correct this condition before painting.

D. Metal Substrate:

1. General: Repair defects including dents and gouges more than 1/2 inch (13 mm) across and all holes and cracks by filling with metal patching compound and sanding smooth. Remove burrs and protruding fasteners.
2. Prepare repair locations by wire-brushing and solvent cleaning. Use mechanical rust removal method to clean off rust.
3. Prime iron and steel surfaces immediately after repair to prevent flash rusting. Stripe paint corners, crevices, bolts, welds, and sharp edges. Apply two coats to surfaces that will be inaccessible after completion of the Work.

3.05 MATERIALS PREPARATION

A. Mix and prepare painting materials in accordance with manufacturer's directions.

B. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.

C. Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and strain material before using.

D. Use thinners approved by paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.06 APPLICATION

A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Provide finish coats that are compatible with prime coats
.
2. On previously painted surfaces, spot prime any bare surfaces before applying final coat.

3. The number of coats required is the same regardless of the application method. Do not apply following coats until the previous coat has cured as recommended by the manufacturer. Sand between applications where required to produce a smooth even surface.

4. Apply additional coats when undercoats, stains or other conditions show through final coat, until paint film is of uniform finish, color and appearance. Edges, corners, crevices, welds, and exposed fasteners shall receive a dry film thickness equivalent to that of flat surfaces.

5. Paint surfaces behind movable equipment and furniture.

6. Paint surfaces behind permanently-fixed equipment or furniture with prime coat before final installation of equipment.

7. Paint back sides of primed access panels, and removable or hinged covers to match exposed surfaces.

8. Omit primer on metal surfaces that have been shop-primed and touch-up painted, unless otherwise indicated.

B. Scheduling Painting: Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation.

1. Allow sufficient time between successive coatings to permit proper drying.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's instructions.

1. Brushes: Use brushes best suited for the material applied.

2. Rollers: Use rollers of carpet, velvet back or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.

3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

D. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate.

E. Mechanical and Electrical Work: Painting mechanical and electrical work is limited to items exposed to the exterior. Finish to match adjoining surfaces.

1. Mechanical items to be painted include, but are not limited to, piping, hangers, and supports; supports; motors and mechanical equipment; and accessory items.

2. Electrical items to be painted include, but are not limited to conduit and fittings, panels, and switchgear.

F. Prime Coats: Before applying finish coats, apply a prime coat. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas to assure a finish coat with no burn-through or other defects.

G. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness and other surface imperfections will not be acceptable.

H. Transparent (Clear) Finishes: Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.

I. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

3.07 FIELD QUALITY ASSURANCE

A. The Owner reserves the right to invoke the following test procedure at any time and as often as the Owner deems necessary during painting.

1. The Owner will engage the services of an independent testing agency to sample the paint material being used. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.

2. The testing laboratory will perform appropriate tests for material analysis, abrasion resistance, reflectivity, flexibility, washability, absorption, accelerated weathering, dry opacity, accelerated yellowness, recoating, skinning, color retention, alkali and mildew resistance, and application to specified mil thicknesses.

3. If test results show material being used does not comply with specified requirements, the Contractor may be directed to stop painting, remove noncomplying paint, pay for testing, repaint surfaces coated with rejected material, and remove rejected material from previously painted surfaces if, upon repainting with specified paint, the two coatings are incompatible.

3.08 CLEANING

A. Clean-Up: During progress of work, remove discarded paint materials, rubbish, cans and rags at end of each work day.

B. Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by washing and scraping; do not scratch or damage finished surfaces.

3.01 EXTERIOR PAINT SCHEDULE (Match existing colors)

A. Ferrous Metal, Acrylic Semigloss:

First Coat:	661 Metal Prime
Second and Third Coats:	124 Mirro Glide SG

B. Cement Board, Concrete, Concrete Block, Acrylic Flat:

First Coat:	266 Epotilt
Second and Third Coats:	203 Duratec II

C. 1. Wood Trim:

First Coat:	Moorwhite Exterior Wood Primer (100)
Second and Third Coats:	ben Low Lustre 542

2. Previously Painted Hard Board and Wood Trim:

Spot Prime First Coat:	Moorwhite Exterior Wood Primer (100)
Second Coat:	ben Low Lustre 542

3.02 INTERIOR PAINT SCHEDULE (Match existing colors)

A. Gypsum Board, 100% Acrylic Flat Low-Sheen

First Coat:	061 Aquaseal
Second and Third Coats:	126 Mirro Glide LS

B. Gypsum Board, 100% Acrylic Semigloss:

First Coat:	061 Aquaseal
Second and Third Coats:	124 Mirro Glide SG

C. Concrete Block, 100% Acrylic Semigloss:

First Coat:	262 Acrylic Block Filler
Second and Third Coats:	124 Mirro Glide SG

D. Ferrous Metal, 100% Acrylic Low-Sheen:

First Coat:	661 Metal Prime
Second Coat:	367 Fraflo
Third Coat:	124 Mirro Glide SG

E. Wood Trim, Acrylic Semigloss: Sherwin Williams

First Coat:	W 707 Unikote
Second and Third Coats:	W 450 Decloglo

END OF SECTION

DIVISION 10

SPECIALTIES

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SECTION 10 14 00

SIGNAGE

1 GENERAL

1.01 SUMMARY

A. This Section describes the requirements for furnishing and installing the following interior signs:

1. Toilet room entry signage.

B. Related Sections: The completion of the work described in this Section may require work in or coordination with other Sections of these specifications. The Contractor and the sub-contractor shall be responsible for identifying and including all related work in other Sections of these specifications and/or drawings necessary for a complete installation of the work described in this Section. These related Sections include but are not limited to the following:

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

1.02 SUBMITTALS

A. All measurements shall be in imperial units.

B. Product Data: Manufacturer's construction details relative to materials, dimensions of individual components, profiles, and finishes for each type of sign required.

C. Provide professional graphics and signage design and coordination services to provide the following:

1. Shop Drawings: Furnish shop drawings for fabrication and erection of signs. Include plans, elevations, and large-scale sections of typical members and other components. Show anchors, grounds, reinforcement, accessories, layout, and installation details.
2. Furnish message list for each sign required, including large scale details of wording and layout of lettering.

3. For signs supported by or anchored to permanent construction, furnish setting drawings, templates, and directions for installation of anchor bolts and other anchors.

4. Work with Owner to compile and review messages and coordinate locations.

D. Samples: Furnish samples of each exposed material, including letters and other graphics, showing finish, color, and qualities of fabrication and design.

E. Location schedule for each sign.

1.03 QUALITY CONTROL

A. The Contractor shall be responsible for verifying and complying with the accessibility requirements fo the International Building Code, the Americans with Disabilities Act and all other applicable codes and ordinances.

2 PRODUCTS

2.01 APPROVED MANUFACTURERS

A. ASI, Best, The Southwell Company, Nelson-Harkins or approved equal.

2.02 MATERIALS

A. Signs shall be sign manufacturer's standard one piece photopolymer sign face with tactile braille and letters or acrylic sign face with applied tactile lettering and braille, at manu-facturer's option, and shall be interior rated.

B. Sign materials and fabrication shall comply with applicable IBC and ADA signage requirements.

C. Sign Finish: Eggshell, matte, or non-glare as selected by the Architect.

D. Copy: 5/8- minimum, 2"-maximum as recommended by sign manufacturer for required copy, raised minimum 1/32".

E. Letters: San Serif, style as indicated or as selected by the Architect.

F. Braille: Grade 2, integral with sign.

G. Mounting: Vinyl foam tape unless mechanical fasteners are indicated.

H. Color: Metallic Silver. By Architect

2.03 SIGN SUMMARY

A. Toilet Room Entry Signage:

1. Provide clear matte acrylic plastic with symbols as follows. Colors as selected by the Architect.

a. Men: 12" equilateral triangle with international symbol for men.
b. Women: 12"-diameter circle with international symbol for women.

2. Provide sign with raised letters and braille on the wall adjacent to the latch outside the door. Where there is no wall space on the latch side and at double leaf doors, provide sign on nearest adjacent wall.

3. Center symbols on door and signs on wall at a height of 60" above finished floor.

B. Room Identification Signs at Toilet Rooms and as Required for Accessibility:

1. Provide one sign adjacent to latch side of doors or on the nearest adjacent wall where indicated. Signs shall identify room name as directed by the Architect.

2. Provide signs with raised upper case letters with Grade 2 Braille. Comply with ADA Article 4.30.

3. Mount signs 60" above finish floor to centerline of sign.

2.01 SIGN SCHEDULE

Item	Qty.	Description
1	2	Unisex, ADA restroom - See architectural drawings for requirements
2	2	Tactile Exit signage – See architectural drawings for requirements
3	1	ISA Sign – See architectural drawings for requirements
4	1	Accessible parking – See civil drawings for requirements
5	1	Tow Away – See civil drawings for requirements
6		
7		
8		

3 EXECUTION

3.01 INSTALLATION

A. Locate where indicated and as required by applicable codes and secure with specified fasteners.

B. Install level, plumb and at height indicated or required, with surfaces free from distortion or other appearance defects.

C. Where signs are adhesively applied, adhesive shall be spread over full contact area.

3.02 CLEANING AND PROTECTION

A. At completion of installation, clean soiled surfaces in accordance with manufacturer's instructions. Protect units from damage until final acceptance.

END OF SECTION

DIVISION 22

PLUMBING

SECTION 22 00 00

GENERAL REQUIREMENTS - PLUMBING

PART 1 – GENERAL

1.01 DESCRIPTION – This Section 22 00 00 includes General Requirements for the work comprising the following sections:

A. Section 22 07 00 Plumbing Piping Insulation

B. Section 22 11 00 13 Domestic Water Sterilization

C. Section 22 11 16 Domestic Water Piping

D. Section 22 11 19 Plumbing Specialties

E. Section 22 13 16 Sanitary Sewer and Vent Piping

F. Section 22 40 00 Plumbing Fixtures

1.02 WORK INCLUDED

A. Provide all materials, equipment, labor, fabrication, specialties, and items necessary and incidental to the installations.

B. Work included shall also include transportation, storage, utilities and required licenses and permits.

1.03 RELATED WORK AND REQUIREMENTS

A. The work of this Section shall require work in coordination with other Divisions outside of this Section as follows:

1. Division 1 – General Requirements

2. Division 2 – Demolition and Site Work

1.04 QUALITY ASSURANCE

A. Comply with Division 1 requirements regarding Quality Control and Assurance.

B. Products Criteria:

1. Standard Products: Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least 3 years. However, digital electronics devices, software and systems such as controls, instruments, computer work station, shall be the current generation of technology and basic design that has a proven satisfactory service record of at least three years.

2. All items furnished shall be free from defects that would adversely affect the performance, maintainability and appearance of individual components and overall assembly.

3. The products and execution of work specified in Division 22 shall conform to the referenced codes and standards as required by the specifications. If the local codes are more stringent, then the local code shall apply. Any conflicts shall be brought to the attention of the Engineer of Record.

4. Multiple Units: When two or more units of materials or equipment of the same type or class are required, these units shall be products of one manufacturer.

5. Asbestos products or equipment or materials containing asbestos shall not be used.

C. Manufacturer's Recommendations: Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the Engineer of Record prior to installation. Installation of the item will not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

D. Execution (Installation, Construction) Quality:

1. All items shall be applied and installed in accordance with manufacturer's written instructions. Conflicts between the manufacturer's instructions and the contract drawings and specifications shall be referred to the Engineer of Record for resolution. Written hard copies or computer files of manufacturer’s installation instructions shall be provided to the Engineer of Record at least two weeks prior to commencing installation of any item.

E. Plumbing Systems: CPC, California Plumbing Code, 2013.

1.05 SUBMITTALS

A. Comply with Division 1 requirements regarding submittals and the requirements herein.

B. Contractor shall make all necessary field measurements and investigations to assure that the equipment and assemblies will meet contract requirements.

C. If equipment is submitted which differs in arrangement from that shown, provide drawings that show the rearrangement of all associated systems. Approval will be given only if all features of the equipment and associated systems, including accessibility, are equivalent to that required by the contract.

D. Prior to submitting layout drawings for approval, contractor shall certify in writing that manufacturers of all major items of equipment have each reviewed drawings and specifications, and have jointly coordinated and properly integrated their equipment and controls to provide a complete and efficient installation.

E. Upon request by Engineer of Record, lists of previous installations for selected items of equipment shall be provided. Contact persons who will serve as references, with telephone numbers and e-mail addresses shall be submitted with the references.

F. Manufacturer's Literature and Data: Manufacturer's literature shall be submitted under the pertinent section rather than under this section.

1. Hangers, inserts, supports and bracing. Provide load calculations for variable spring and constant support hangers.

G. Maintenance Data and Operating Instructions:

1. Maintenance and operating manuals in accordance with Division 01 for systems and equipment and as stated herein.

H. Clearly and neatly strike out of irrelevant information. Clearly and neatly tag and mark equipment, options and specialties and special features. Key tags to match tags on Drawings.

1. If substituting on Specified equipment provide comprehensive written comparison of characteristics between specified and substituted equipment. Doing a data "dump" of Operation and Maintenance manuals, and similar "total catalog dumps" shall not be an acceptable method of submission.

I. Provide information in an easily readable and legible format presentation.

J. Provide an index with corresponding labeled and tabbed dividers for sections, in a three ring hard cover binder or hard cover binding folder. Loose leaf sections, provided separately, shall not be acceptable. Front index shall include, at a minimum:

1. Full, formal, name and address, including zip code, for job.

2. Company name, address, phone and fax numbers of General Contractor, including phone land line number of job trailer and cellular phone number and name of job site Superintendent. Also provide contact name of office Project Manager.

3. Name, address, phone and fax number of Plumbing Contractor, including phone land line of job trailer, if applicable, and cellular phone number and name of job site Superintendent. Also provide contact name of office Project Manager.

K. Submit all items at the same time.

L. Unless specified otherwise in Division 1 requirements submit 5 copies of data. Engineer will return 4 copies while retaining one for internal office use as a Project Record Document.

M. Submittals shall be prepared and submitted in a timely fashion to allow adequate time for ordering of long lead time equipment and materials.

1.06 DELIVERY, STORAGE AND HANDLING

A. Protection of Equipment:

1. Equipment and material placed on the job site shall remain in the custody of the Contractor until phased acceptance, whether or not the Owner has reimbursed the Contractor for the equipment and material. The Contractor is solely responsible for the protection of such equipment and material against any damage.

2. Damaged equipment shall be replaced with an identical unit as determined and directed by the Engineer of Record. Such replacement shall be at no additional cost to the Owner.

3. Interiors of new equipment and piping systems shall be protected against entry of foreign matter. Both inside and outside shall be cleaned before painting or placing equipment in operation.

4. Existing equipment and piping being worked on by the Contractor shall be under the custody and responsibility of the Contractor and shall be protected as required for new work.

B. Cleanliness of Piping and Equipment Systems:

1. Care shall be exercised in the storage and handling of equipment and piping material to be incorporated in the work. Debris arising from cutting, threading and welding of piping shall be removed.

2. Piping systems shall be flushed, blown or pigged as necessary to deliver clean systems.

3. The interior of all tanks shall be cleaned prior to delivery and beneficial use by the Owner. All piping shall be tested in accordance with the specifications and the California Plumbing Code (CPC), latest edition. All filters, strainers, fixture faucets shall be flushed of debris prior to final acceptance.

4. Contractor shall be fully responsible for all costs, damage, and delay arising from failure to provide clean systems.

1.07 APPLICABLE PUBLICATIONS

A. The publications listed below shall form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. California Building Codes

1. CBC - California Building Code

2. CMC - California Mechanical Code

3. CPC - California Plumbing Code

4. CEC - California Electrical Code

5. CFC - California Fire Code

6. CEC - California Energy Commission (Title 24)

C. When the work calls for more stringent requirements than the above listings the Specifications and Drawings shall have precedence.

1.08 SITE VISIT AND FAMILIARIZATION

A. Visit the site and become familiar with the Drawings and Specifications. Examine the site and understand the conditions under which the Contract shall be performed.

B. Refer to Division 1 for Pre-Bid Conference requirements.

1.09 REVIEW OF CONSTRUCTION

A. Work may be reviewed, without prior notice, at any time by representatives of Owner.

B. Advise Owner and Owner Representative when work is ready for review at the following times:

1. Prior to concealment of Work in walls and above ceilings and any other enclosable spaces. Conceal Work only after obtaining Owner and Architect consent.

C. Maintain an on the job set of Specifications and Drawings for use by Owner and representatives.

1.10 BID DOCUMENT DESCRIPTION

A. Specifications describe quality of materials and equipment.

B. Drawings describe the work in diagrammatic form. Drawings do not show exact detail and arrangements. Final requirements of the Work shall be determined by the Contractor after coordination with other trades.

1.11 DEFINITIONS

A. Definitions following may not match those in other sections. Definitions listed here govern this part of the Work and take precedence over those listed elsewhere.

1. Concealed: Embedded in masonry or other construction, installed in furred spaces, within partitions or hung ceilings, in trenches, crawl spaces, or in enclosures.

2. Connect: Complete hook-up of items with required services.

3. Down: A vertical pipe or piece of work that does penetrate a floor.

4. Drop: A vertical pipe or piece of work that does not penetrate a floor.

5. Exposed: Not installed underground or "concealed" as defined within this list.

6. Provide: To furnish, supply, install and connect up complete and ready safe and regular operation of particular work referred to unless specifically noted.

7. Supply: To purchase, procure, acquire and deliver compete with related accessories.

8. Work: Labor, materials, equipment, apparatus, controls, accessories and other items required for complete and proper operation.

9. Install: To erect, mount and connect complete with related accessories.

10. Riser: A vertical pipe or piece of work having a vertical length greater than one story height.

11. Indicated, Shown or Noted: As indicated, shown or noted on Drawings and Specifications.

12. Other Division(s): Specification Sections that do not include the HVAC Divisions.

13. Motor Controllers: Manual or magnetic starters (with or without switches), individual pushbuttons or hand-off-automatic (HOA) switches controlling the operation of the motors.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Materials, equipment and supplies shall be new and latest types and models of manufacturers and shall bear identification markings, nameplates and labels.

B. Equipment specified by manufacturer's number shall include all accessories, controls, etc., listed in catalog as standard with equipment. Provide optional or additional accessories as specified or scheduled incidental to the Work such as, but not limited to, caulking, gaskets, sealants, fasteners, etc.

C. Where no specific make of material or equipment is mentioned, any first class product of good reputable manufacturer may be used, provided it conforms to requirements of system and meets acceptance of Owner.

D. Equipment, material and supplies damaged during transportation, installation and operation is considered as totally damaged and shall be replaced with new. Variance from this is permitted only with approval of Owner.

E. Provide an authorized representative to constantly supervise work of this Division, check all materials prior to installation for conformance with Drawings, Specifications, reviewed Submittals and reviewed Coordination Drawings as referenced in Part 1.

F. Electrical Work performed in the service of the plumbing and piping installation shall conform to Division 26 Electrical requirements. Provide weatherproof devices and installations for Work exposed to the elements.

2.02 COMPATIBILITY OF RELATED EQUIPMENT

A. Equipment and materials installed shall be compatible in all respects with other items being furnished and with existing items so that the result will be a complete and fully operational system that conforms to contract requirements.

2.03 PIPE AND EQUIPMENT SUPPORTS AND RESTRAINTS

A. Model numbers listed are by Cooper Industries.

B. For Attachment to Wood Construction: Wood screws or lag bolts.

C. Hanger Rods: Hot-rolled steel, ASTM A36 or A575 for allowable load listed in MSS SP-58. For piping, provide adjustment means for controlling level or slope. Types 13 or 15 turn-buckles shall provide 1-1/2 inches minimum of adjustment and incorporate locknuts. All-thread rods are acceptable.

D. Pipe Hangers and Supports: (MSS SP-58), use hangers sized to encircle insulation on insulated piping. To protect insulation, provide Type 39 saddles for roller type supports or insulated calcium silicate shields. Provide Type 40 insulation shield or insulated calcium silicate shield at all other types of supports and hangers including those for insulated piping.

1. General Types (MSS SP-58):

a. Standard clevis hanger: Type 1; provide locknut.

b. U-bolt clamp: Type 24.

2. Plumbing Piping (Other Than General Types):

a. Horizontal piping: Type 1, 5, 7, 9, and 10.

b. Chrome plated piping: Chrome plated supports.

c. Hangers and supports in pipe chase: Prefabricated system ABS self-extinguishing material, not subject to electrolytic action, to hold piping, prevent vibration and compensate for all static and operational conditions.

d. Blocking, stays and bracing: Angle iron or preformed metal channel shapes, 18 gage minimum.

2.04 ASBESTOS

A. Materials containing asbestos are not permitted.

PART 3 – EXECUTION

3.01 ARRANGEMENT AND INSTALLATION OF EQUIPMENT AND PIPING

A. Location of piping, sleeves, inserts, hangers, and equipment, access provisions shall be coordinated with the work of all trades. Piping, sleeves, inserts, hangers, and equipment shall be located clear of windows, doors, openings, light outlets, and other services and utilities. Equipment layout drawings shall be prepared to coordinate proper location and personnel access of all facilities. The drawings shall be submitted for review.

B. Manufacturer's published recommendations shall be followed for installation methods not otherwise specified.

C. Structural systems necessary for pipe and equipment support shall be coordinated to permit proper installation.

D. Cutting Holes:

1. Holes shall be located to avoid interference with structural members such as beams or grade beams. Holes shall be laid out in advance and drilling done only after approval by Structural Engineer of Record. If the Contractor considers it necessary to drill through structural members, this matter shall be referred to Structural Engineer of Record for approval.

2. Waterproof membrane shall not be penetrated.

E. Protection and Cleaning:

1. Equipment and materials shall be carefully handled, properly stored, and adequately protected to prevent damage before and during installation, in accordance with the manufacturer's recommendations and as approved by the Engineer of Record. Damaged or defective items in the opinion of the Engineer of Record, shall be replaced.

2. Protect all finished parts of equipment, such as shafts and bearings where accessible, from rust prior to operation by means of protective grease coating and wrapping. Close pipe openings with caps or plugs during installation. Pipe openings, equipment, and plumbing fixtures shall be tightly covered against dirt or mechanical injury. At completion of all work thoroughly clean fixtures, exposed materials and equipment.

F. Work in bathrooms, restrooms, housekeeping closets: All pipe penetrations behind escutcheons shall be sealed with plumber’s putty.

3.02 PIPE AND EQUIPMENT SUPPORTS

A. Where hanger spacing does not correspond with joist or rib spacing, use structural steel channels secured directly to joist and rib structure that will correspond to the required hanger spacing, and then suspend the equipment and piping from the channels. Holes shall be drilled or burned in structural steel ONLY with the prior written approval of the Structural Engineer of Record.

B. The use of chain pipe supports, wire or strap hangers; wood for blocking, stays and bracing, or hangers suspended from piping above shall not be permitted. Rusty products shall be replaced.

C. Hanger rods shall be used that are straight and vertical. Turnbuckles for vertical adjustments may be omitted where limited space prevents use. A minimum of 15 mm (1/2-inch) clearance between pipe or piping covering and adjacent work shall be provided.

D. For horizontal and vertical plumbing pipe supports, refer to the California Plumbing Code (CPC), latest edition, and these specifications.

E. Overhead Supports:

1. The basic structural system of the building is designed to sustain the loads imposed by equipment and piping to be supported overhead.

2. Provide steel structural members, in addition to those shown, of adequate capability to support the imposed loads, located in accordance with the final approved layout of equipment and piping.

3. Tubing and capillary systems shall be supported in channel troughs.

3.03 CLEANING AND PAINTING

A. Prior to final inspection and acceptance of the plant and facilities for beneficial use by the Owner, the plant facilities, equipment and systems shall be thoroughly cleaned and painted.

B. In addition, the following special conditions apply:

1. Cleaning shall be thorough. Solvents, cleaning materials and methods recommended by the manufacturers shall be used for the specific tasks. All rust shall be removed prior to painting and from surfaces to remain unpainted. Scratches, scuffs, and abrasions shall be repaired prior to applying prime and finish coats.

3.04 STARTUP AND TEMPORARY OPERATION

A. Startup of equipment shall be performed as described in the equipment specifications. Vibration within specified tolerance shall be verified prior to extended operation.

3.05 OPERATING AND PERFORMANCE TESTS

A. Should evidence of malfunction in any tested system, or piece of equipment or component part thereof, occur during or as a result of tests, make proper corrections, repairs or replacements, and repeat tests at no additional cost to the Owner.

B. When completion of certain work or system occurs at a time when final control settings and adjustments cannot be properly made to make performance tests, then make performance tests such systems respectively during first actual seasonal use of respective systems following completion of work.

3.06 OPERATION AND MAINTENANCE MANUALS

A. Provide four bound copies. The Operations and maintenance manuals shall be delivered to the Owner not less than 30 days prior to completion of a phase or final inspection.

B. All new and temporary equipment and all elements of each assembly shall be included.

C. Manufacturer's installation, maintenance, repair, and operation instructions for each device shall be included. Assembly drawings and parts lists shall also be included. A summary of operating precautions and reasons for precautions shall be included in the Operations and Maintenance Manual.

D. Lubrication instructions, type and quantity of lubricant shall be included.

3.07 PROTECTION OF WORK

A. Cap all fixture, pipe and equipment openings daily to protect from dust, moisture and incidental debris.

B. Porous materials that become wetted shall be replaced with new. Drying is not sufficient as it introduces the possibility of microbial growth. This applies to insulation and any material that acts as a sponge.

C. All air distribution shall be capped during construction to prevent accumulation of dirt, dust and debris.

3.08 SAFETY

A. The contractor shall be solely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This shall also apply to non-normal working hours.

3.09 RECORD DRAWINGS

A. Contractor is required to provide record Drawings in accordance with Division 01 – General Requirements and this section.

B. Keep and accurate record of job progress including as-built locations and of the Work. Keep record up-to-date on legible full size copies as job progresses. Make available to Owner and Owner representatives during project.

C. In addition to any other requirements, include on as-built Drawings the following:

1. Changes in location of piping or equipment.

3.10 COMPLETION

A. When Work is completed, or when Owner or Owner representative directs, remove surplus equipment, material, waste, and rubbish and leave building in satisfactory condition.

B. Adjust faucets and flush valves to give proper supply of water and leave in first class condition.

3.11 WARRANTIES AND GUARANTEES

A. Contractor is required to provide warranties in accordance with Division 1 – General Requirements.

1. Collect all warranties and guarantees for materials and equipment and neatly fill out all required information for the Owner. Provide one copy of each certificate for turn over to Architect. Arrange certificates in a tabbed and indexed binder for Architect ease of use.

B. At the completion of the work contractor shall guarantee to repair or replace materials and workmanship found defective for a period of one year from date of filing of Notice of Completion. This work shall be performed at no cost to the Owner

1. Work of other trades damaged as a result of faulty workmanship or materials shall be repaired at no cost to the Owner.

END OF SECTION

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SECTION 22 07 00

PLUMBING INSULATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide complete plumbing system insulation work for piping, equipment, and other items where shown on the drawings.

B. Insulation work shall comply with the requirements of the 2013 CEC.

C. Insulate all hot water and hot water recirculation piping. Insulate all cold water piping where it occurs in un-conditioned spaces (attics, crawl spaces, etc.). Insulate all condensate drainage piping. Insulate all piping, equipment, valves, tanks, etc., that come uninsulated from the manufacturer.

D. Insulate all roof drain piping and all roof overflow drain piping.

E. All work of this section shall comply with Section 22 00 00 GENERAL REQUIREMENTS - PLUMBING

PART 2 – PRODUCTS

2.01 GENERAL

A. The type of insulation and its installation shall be in accordance with this Specification for each service and the application technique shall be as recommended by the manufacturer.

B. Fire Rating of all insulation shall have a composite (insulation, jacket or facing and adhesive used to adhere facing or jacket to insulation) fir and smoke hazard, as tested by ASTM E84, NFPA 255, and U.L. 723, not to exceed a flame spread of 25 and smoke developed by 50.

1. Accessories such as adhesives, mastics, tapes, and cements shall have the same component ratings as listed.

2. Products shall have integral factory labeling indicating that flame spread and smoke developed ratings do not exceed the above requirements.

2.02 FIXTURE INSULATION

A. ADA accessible fixtures shall have the hot water supply and waste piping insulated from connections at sink to connections at wall, building, or cabinetry surfaces. ADA-conforming, wheelchair accessible lavatory P-trap and angle valve assemblies shall be covered with the molded, antimicrobial TRUEBRO, INC. Lav-Guard undersink protective pipe covering of white color. Covers shall be secured with Snap-Clip flush reusable fasteners, angle stop shall have Lock-Lid locking access covers. Provide with accessory covers to fit standard 5" offset wheelchair strainers and 6" Kohler offset wheelchair strainers, where occurs.

1. There shall be no sharp or abrasive surfaces under lavatories.

2.03 PIPING INSULATION

A. Type A: Molded fiberglass

1. Maximum K factor: 0.23 at 75 deg. F mean temperature

2. Minimum Density: 4 lb/PCF

3. Factory applied all service or all purpose jacket (ASJ): Fire retardant laminate of white Kraft facing, glass scrim reinforcing and aluminum foil.

4. Similar to Owens-Corning 650 ASJ.

B. Type B: Molded fiberglass fittings

1. Maximum K Factor: 0.23 at 75 deg. F mean temperature

2. Minimum Density: 4 lb/PCF

3. Similar to Epolux Hamfab molded fittings

C. Finishes, Adhesives, Sealants and Jackets for Piping Insulation:

1. Type 1: Fitting covers

a. Molded white PVC jacket

b. U.L. Class 1

c. Maximum permeance: 0.05

d. Similar to Manville Zeston

2. Type 2: Vapor barrier coating

a. White vapor barrier coating with 10 x 10 or 20 x 20 mesh white glass, polyester or nylon cloth reinforcing membranes.

b. 31 mil dry film thickness

c. Maximum permeance: 0.05

d. Similar to Foster Tite-Fit 30-35, U.L. Label

D. Wire, Banding and Fastening Devices for Piping Insulation:

1. Wire: Minimum 16 gauge copper clad annealed steel wire

2. Bands: Aluminum, 3/4 in. nominal width with wing seals, or minimum 0.020 inch thick, where specified.

3. Staples: Outward clinching type of corrosion resistant steel.

4. Weld pins to support and fasten duct insulation: Minimum 1/8 in. diameter with speed washer or integral flange of minimum 1-3/8 in. diameter.

5. Insulation Tape

a. U.L. rated

b. All service or foil-scrim jacket to match insulation

c. Width as noted

d. Similar to Compac Corp. UL ASJ or FKJ PS Tape

E. Piping, Valves and Fittings Insulation Applications:

1. Low temperature hot piping systems - 100 deg F to 250 F.

a. Low temperature hot water supply and recirculation piping.

b. Insulation schedule:

<u>Insulation Schedule - Low Temperature</u>
<u>Hot and Cold Water Piping Systems</u>

	INDOOR
Type:	A
Finish:	1 or 2
Fittings and Valves:	

Type	B
Finish	1 or 2
Thickness: Up to 1 in. IPS	1 In.
Thickness: 1-1/2 - 4 in. IPS	2 in.
Vaporseal	Not required

2. Miscellaneous Cold Piping:

   a. Including:

      1. Domestic cold water concealed in unconditioned spaces and exposed outside to the elements.

   b. Insulation Requirements.

      1. Insulation: Type A
      2. Vapor seal required.
      3. Fittings: Type B with Type 2 finish

3. Non-Insulated Piping: Natural gas, vents and drains.

PART 3 – EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation products in accordance with the manufacturer's written instruction, Commercial and Industrial Standards, and recognized industry practices to ensure that the insulation serves the intended purpose. Surfaces shall be thoroughly cleaned with all testing successfully completed prior to insulating.

B. In addition to where specified provide insulation by type and locations as indicated on the Drawings.

C. After the installation of insulation protect the insulation from moisture and weather damage.

D. Before applying insulation:

   1. Required pressure and leakage tests of joints and connections shall be completed.

   2. Surfaces shall be clean of dust, grease and foreign matter and dry before application of insulation.

3. All insulation joints shall be butted firmly together and all jackets shall be smoothly and securely installed.

4. Insulate each pipe individually. Do not use scrap pieces of insulation where a full-length section will fit. Except for specific exceptions, insulate entire piping system as specified.

E. Piping:

1. Longitudinal Overlaps:

   a. 2 in. minimum.

   b. For exposed work: toward ceiling or wall.

2. Continuous insulation passing through sleeves or other openings.

3. Metal frames to protect edges of openings in insulation.

4. Penetration of fire or smoke barriers: Wrap pipe with rock wool insulation, seal jacket seam and seal joints to adjacent sections of insulation.

5. Fill voids with Keene Super-slick insulating cement, applied in a single coat over hexagonal wire mesh.

6. Valves, fittings, flanges and accessory insulation:

   a. Insulation type as noted above.

   b. Unless otherwise noted, insulate:

      1. Valves including bonnets
      2. Flanges
      3. Fittings
      4. Strainers

   c. Insulation for strainers, fittings and accessories requiring servicing or inspections: Insulation re movable and replaceable without damage, and en- closed within two piece, No. 18 gauge aluminum covers fastened with cadmium plated bolts and nuts.

   d. Insulation of same thickness as adjacent piping insulation.

   e. For piping systems insulated with fiberglass:

      1. Secure insulation with wire.

2. Under 3 in. pipe size, built up coating of Keene Superslick insulating and finishing cement applied over hexagonal wire mesh to match thickness of adjoining pipe insulation, may be used.

3. Finishes:

a) Type 1: Apply factory pre-molded cover and seal edges with Foster Foam seal 30-45 vapor barrier sealer.

b) Type 2: Apply uniform layer of finish coating to cover entire surface of fitting insulation and embed layer of fiber glass tape into wet coating, extending 2 in. over adjoining pipe covering. Apply finish layer of coating over entire surface.

f. Flanged: Insulation sleeve of same material as pipe insulation, to cover flange and overlap insulation on adjacent piping.

7. Wiring, Banding and Fastening Devices: Secure insulation to piping in accordance with following minimum requirements:

a. Piping insulation section 3 ft. long:

1. Type A molded fiberglass: Self-sealing laps may be used. Staples not permitted on vapor sealed piping.

2. Other Types: Per manufacturer's recommendations.

b. Pipe Fitting Insulation:

1. Loops of wire to secure mitered segments of insulation.

2. Wire spiraled on from end to end on blanket insulation.

8. At Pipe Hangers:

a. For fiberglass insulated piping, provide 18 in. long calcium silicate section continuous with adjoining pipe insulation and jacket.

b. Insulation protection saddles and shield specified in Section "Piping for HVAC".

c. No hangers embedded in insulation.

d. Saddles filled with insulation of type specified for service, or filled with insulating cement.

9. Jackets and Facings:

a. All staples sealed with Foster Foam seal 30-45 vapor barrier sealant.

b. Adhere longitudinal laps if self-sealing laps are not used and as necessary to maintain integrity of vapor seal.

c. Adhere 3 in. wide joint strip, of same material as facing, at center of each butt joint, if self-sealing butt strips are not used.

d. Adhesives:

1. Indoor: Foster Foam seal 30-45

F. Weld Pins and Anchors:

1. Spacings: Minimum 12 in. centers and minimum 2 rows per side of duct.

2. Maximum permissible load: 5 lb for 2 in. x 2 in. base plate and 10 lb for 2-3/4 in. x 2-3/4 in. base plate.

3. Clip off pin penetrations flush with insulation surface or facing.

4. Seal pins and washers with 4 in. square pieces of Foster Foam seal 30-45 vapor barrier tape to match facing and adhere with vapor seal adhesive.

G. Adhesives and Coatings:

1. Apply at following rates in accordance with manufacturer's recommendations:

a. Vapor barrier coatings: 50 sq ft/gal.

b. Vaporseal adhesives: 100 sq. ft/gal.

2. Adhesive jackets and facings with wet coat of Foster Foam seal 30-45 adhesive.

3. Lap Sealing: Full width of lap.

4. Surfaces to be adhered: Completely coated with adhesive.

3.02 PROTECTING AND REPLACEMENT

A. Replace damaged insulation that cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.

B. Protection: Insulation Installer shall advise Contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

END OF SECTION

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SECTION 22 11 00 13

DOMESTIC WATER SYSTEMS STERILIZATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide complete domestic water systems sterilization from points of connection as shown on the plans to all fixtures, equipment and miscellaneous devices.

1. Sterilization shall only be commenced after all domestic water systems have been pressure tested and passed.

2. Representative water samples shall be obtained from the system for analysis by a recognized bacteriological laboratory.

3. When all tests are completed certification of successful completion of sterilization shall be submitted.

4. Disinfecting shall conform to AWWA C651.

B. Where new work ties into existing, install isolation ball valves per PLUMBING SPECIALTIES and proceed with sterilization per this section.

C. All work of this section shall comply with Section 22 00 00 GENERAL REQUIREMENTS - PLUMBING

PART 2 – PRODUCTS

NOT USED

PART 3 – EXECUTION

3.01 STERILIZATION PROCEDURE

A. All tests shall be made in the presence of the Owner or Owner's Representative and the local authorities having jurisdiction. At least 72 hours (three days) notice shall be given in advance of all tests. Contractor shall make preliminary tests prior to giving notice of final test.

1. Contractor shall furnish all pumps, gauges, chemicals, instruments and any other equipment, including test medium necessary for conducting prescribed tests.

B. Through a connection to the main entering the building pump in the chlorinating material, either liquid chlorine or hypochlorite grade A or B. The chlorinating material shall provide a dosage of not less than 50 parts per million.

C. The treated water shall be retained in the pipe long enough to destroy all non-spore forming bacteria. The retention time shall be at least 24 hours and shall produce not less than 10 PPM of chlorine at the extreme end of the system at the end of retention. All valves in the system being sterilized shall be open and closed several times during the contact period. The system shall then be flushed with clean water until the residual chlorine is reduced to less than 1.0 ppm. During the flushing period all valves and faucets shall be opened and closed several times. From several points in the system take samples of water in properly sterilized containers for bacterial examination. The sterilizing shall be repeated until tests indicate the absence of pollution for at least two full days. The system will not be reviewed until satisfactory bacteriological results have been obtained and written documents of results submitted.

END OF SECTION

SECTION 22 11 16

DOMESTIC WATER PIPING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide complete site domestic water piping plumbing systems from points of connection to municipalities, points of connection, equipment and miscellaneous devices.

B. System shall be complete with piping, pressure reducing valves, plug valves and related specialties required for an operational system.

C. All work of this section shall comply with Section 22 00 00 GENERAL REQUIREMENTS - PLUMBING

1.02 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of water service piping specialties and are based on specific types and models indicated.

B. Comply with standards of authorities having jurisdiction and appropriate NFPA Standards for fire-protection (where occurs) water service piping including materials, hose threads, installation, and testing.

C. Comply with NFPA 24 for pipe laying, coating and lining, protection against freezing and damage, and restraining.

1.03 APPLICABLE PUBLICATIONS

The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

A. American National Standards Institute (ANSI):

B. American Society of Mechanical Engineers (ASME): (Copyrighted Society)

1. A13.1-96 Scheme for Identification of Piping Systems

2. B16.15-85(R 1994) Cast Bronze Threaded Fittings ANSI/ASME

3. B16.18-01 Cast Copper Alloy Solder-Joint Pressure Fittings ANSI/ASME

4. B16.22-01 Wrought Copper and Copper Alloy Solder Joint Pressure Fittings ANSI/ASME

C. American Society for Testing and Materials (ASTM):

1. B32-03 Solder Metal

2. B75-99(Rev A) Seamless Copper Tube

3. B88-03 Seamless Copper Water Tube

D. American Welding Society (AWS):

1. A5.8-92 Filler Metals for Brazing

PART 2 – PRODUCTS

2.01 INTERIOR DOMESTIC WATER PIPING

A. Pipe: Copper tube, ASTM B88, Type K or L, drawn. For pipe 6 inches and larger, stainless, steel ASTM A312, schedule 10 may be used.

B. Fittings for Copper Tube:

1. Wrought copper or bronze castings conforming to ANSI B16.18 and B16.22. Unions shall be bronze, MSS SP72 & SP 110, solder or braze joints.

2. Mechanically formed tee connection: Form mechanically extracted collars in a continuous operation by drilling pilot hole and drawing out tube surface to form collar, having a height of not less than three times the thickness of tube wall. Adjustable collaring device shall insure proper tolerance and complete uniformity of the joint. Notch and dimple joining branch tube in a single process to provide free flow where the branch tube penetrates the fitting. Braze joints.

C. Adapters: Provide adapters for joining screwed pipe to copper tubing.

D. Solder: ASTM B32 Composition Sb5 HA or HB. Provide non-corrosive flux.

E. Brazing alloy: AWS A5.8, Classification BCuP.

2.02 WATERPROOFING

A. Provide at points where pipes pass through membrane waterproofed floors or walls in contact with earth.

B. Floors: Provide cast iron stack sleeve with flashing device and an under-deck clamp. After stack is passed through sleeve, provide a waterproofed caulked joint at top hub.

C. Walls: See detail shown on drawings.

2.03 DIELECTRIC FITTINGS

A. Provide dielectric couplings or unions between ferrous and non-ferrous pipe.

PART 3 – EXECUTION

3.01 INSTALLATION

A. General: Provide complete domestic water piping system as shown on the drawings and the following;

1. Install branch piping for water from the piping system and connect to all fixtures, valves, cocks, outlets, casework, cabinets and equipment, including those furnished by the Owner or specified in other sections.

2. Pipe shall be round and straight. Cutting shall be done with proper tools. Pipe, except for plastic and glass, shall be reamed to full size after cutting.

3. All pipe runs shall be laid out to avoid interference with other work.

4. Piping shall be run parallel to buildings lines and supported at intervals specified. Branches and points of connection to existing systems shall be taken from the top or side at horizontal connections, not from the bottom. All changes in direction shall be made with standard fittings.

5. Provide a union on one side of each screwed valve, strainer, check valve, control device, etc., to allow for servicing and removal of same.

6. Reducing fittings shall not be used to make reductions in size of pipes. Bushings will not be allowed unless approved.

7. Install union and shut-off valve on pressure piping at connections to equipment.

8. Pipe Hangers, Supports and Accessories:

   a. All piping shall be supported per Section 22 05 29, Hangers and Supports and referenced codes in all sections.

   b. Shop Painting and Plating: Hangers, supports, rods, inserts and accessories used for Pipe supports shall be shop coated with red lead or zinc Chromate primer paint. Electroplated copper hanger rods, hangers and accessories may be used with copper tubing.

9. Install cast escutcheon with set screw at each wall, floor and ceiling penetration in exposed finished locations and within cabinets and millwork.

10. Penetrations:

   a. Fire Stopping: Where pipes pass through fire partitions, fire walls, smoke partitions, or floors, install a fire stop that provides an effective barrier against the spread of fire, smoke and gases. Completely fill and seal clearances between raceways and openings with the fire stopping materials.

b. Waterproofing: At floor penetrations, completely seal clearances around the pipe and make watertight with sealant.

B. Piping shall conform to the following:

1. Domestic Water:

a. Where possible, grade all lines to facilitate drainage. Provide drain valves at bottom of risers. All unnecessary traps in circulating lines shall be avoided.

b. Connect branch lines at bottom of main serving fixtures below and pitch down so that main may be drained through fixture. Connect branch lines to top of main serving only fixtures located on floor above.

3.02 PIPING APPLICATIONS

A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications:

1. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used in applications below, unless otherwise indicated.

2. Exception: Piping in boxes and structures, but not buried, may be joined with flanges or keyed couplings instead of joints indicated.

3. Flanges and special fittings may be used on aboveground piping.

3.03 VALVE APPLICATIONS

A. Drawings indicate valve types and sizes to be used. Where specific valve types are not indicated, the following requirements apply:

1. Underground Valves, 3-Inch NPS and Larger: AWWA, gate valves, non-rising stem, with valve box.

3.01 PIPE IDENTIFICATION TAPE INSTALLATION

A. Install continuous plastic underground warning and identification tape during back-filling of trench for underground water piping. Place the tape 18 inches directly above the piping.

3.02 PROTECTION OF WATER SUPPLIES

A. During the course of construction the Contractor shall take proper steps to protect the potable water supply facilities from contamination within the limits of construction.

B. The following criteria shall be used to govern the installation of water lines in proximity of other utilities considered to be sources of contamination. Sources of contamination included sanitary lines, combination sewers, sanitary manholes, storm water lines, fuel lines, and other utilities indicated or included in the Project Specifications.

1. Parallel Separation: Except as specified hereinafter or otherwise permitted by the Owner, water lines shall be laid at least 10 feet horizontally from existing or proposed sources of contamination. This distance shall be measured edge to edge. If local conditions prevent a lateral separation of 10 feet, then the top of the source of contamination shall be at least 18 inches below the bottom of the water lines. Where this vertical separation cannot be obtained, the source of contamination shall be sleeved, encased, or shall be constructed of mechanical joint water pipe and pressure tested in place to 50 psi without leakage prior to backfilling.

2. Crossings: Water and the source of contamination lines crossing each other shall be laid to provide a separation of at least 18 inches between the bottom of the water line and the top of the source of contamination line. Where this vertical separation cannot be obtained, the source of contamination shall be encased in concrete for a minimum distance of 10 feet from the water line on each side of the crossing.

a. Sources of contamination lines crossing over a water line shall, in addition, have a vertical separation of at least 18 inches between the bottom of the sewer and the top of the water line. The contractor shall provide adequate structural support for the sewer to prevent excessive deflection of the joints and settling on and breaking the water line. Deflection shall not exceed 0.27 inches. Also, the water line shall be installed in a watertight steel sleeve, sealed at each end at a distance of 10 feet from the source of contamination.

b. Water lines shall not pass through nor come in contact with any part of a source of contamination.

c. During the course of construction should the Contractor become aware that the work will result in the violation of the criteria herein the Contractor shall immediately notify the COTR. Upon such notification, the COTR will issue instructions of remedial measures.

3.03 TESTS

A. General: Test system either in its entirety or in sections.

B. Potable Water System: Test after installation of piping and domestic water heaters, but before piping is concealed, before covering is applied, and before plumbing fixtures are connected. Fill systems with water and maintain hydrostatic pressure of 100 psi gage for two hours. No decrease in pressure is allowed. Provide a pressure gage with a shutoff and bleeder valve at the highest point of the piping being tested.

C. All Other Piping Tests: Test new installed piping under 1 1/2 times actual operating conditions and prove tight for a minimum of 2 hours.

3.04 STERILIZATION

A. After tests have been successfully completed, thoroughly flush and sterilize the interior domestic water distribution system in accordance with AWWA C651.

B. Use either liquid chlorine or hypochlorite for sterilization.

END OF SECTION

SECTION 22 11 19

PLUMBING SPECIALTIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide complete plumbing specialties, materials, equipment, and miscellaneous devices to make the plumbing systems completely functional.

B. Items shall include, but not be limited to:

1. Dielectric Unions

2. Escutcheons

C. All work of this section shall comply with Section 22 00 00 GENERAL REQUIREMENTS - PLUMBING

PART 2 – PRODUCTS

2.01 DIELECTRICS

A. Dielectric unions shall be used to prevent accelerated corrosion and deterioration in the piping systems due to galvanic and stray current. Install between pipes made of ferrous and non-ferrous metals. Unit shall consist of a union nut, two tailpieces, and a gasket that separates the tailpieces to prevent an electric current from occurring. Maximum Pressure: 250psi. Watts Series 3001A

2.02 ESCUTCHEONS

A. Where exposed pipes pass through floors, walls, or ceilings, they shall be filled with neat, spun or stamped metal escutcheons, firmly secured to the pipes. Escutcheons shall be of sufficient outside diameter to amply cover up the sleeved openings for the pipes and shall be installed so as to provide a neat finish. Escutcheons shall be attached by means of expansion bolts, clamps or set screws.

1. At exposed locations provide chrome plated finishes.

PART 3 – EXECUTION

3.01 GENERAL INSTALLATION

A. Install all equipment and materials according to the manufacturers written instructions, and in good workmanship.

B. The Contractor shall be responsible for protecting against damage from building materials, acids, toots, and equipment included in these specifications.

END OF SECTION

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SECTION 22 13 16

DRAIN, WASTE, AND VENT SYSTEMS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide complete drain, waste, and vent systems from point of connection to site plumbing to all fixtures, services and termination points.

B. System shall be complete with piping and related specialties required for an operational system

C. All work of this section shall comply with Section 22 00 00 GENERAL REQUIREMENTS – PLUMBING

D. Cast iron soil pipe shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and manufactured by AB&I, Charlotte or Tyler or receive prior written approval of the engineer.

1.02 SUBMITTALS

A. Submit in accordance with general conditions and Section 22 00 00.

B. Manufacturer's Literature and Data:

1. Piping.

2. Floor Drains.

3. Cleanouts.

4. All items listed in PART 2 – PRODUCTS.

C. Detailed coordinated drawing of clamping device and extensions when required in connection with the waterproofing membrane or for floor drains.

PART 2 – PRODUCTS

2.01 SANITARY WASTE, DRAIN AND VENT PIPING

A. Above and Below Ground: No-hub cast iron soil pipe and fittings manufactured from gray cast iron with a tensile strength of not less than 21,000 psi, bituminous coated interior and exterior, conforming to the requirements of ASTM A888 and CISPI Standard 301. Each length of pipe shall be hydrostatically {water} tested by the manufacturer to verify compliance. All pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute and listed by NSF international. All pipe and fittings shall be the same manufacturer.

B. No Hub Couplings:

1. (Medium Duty) Above Ground: No-Hub couplings shall comply with requirements of Factory Mutual 1680 Class 1, 15 PSI rated pressure. No-Hub couplings shall be constructed of Type 304 stainless steel worm drive screws. The worm drive clamps shall have a hexagon head to accept a 5/16 Inch socketed torque wrench. The clamps shall be tightened to a minimum of 80 inch pounds. (Single corrugated shield, 4 band 80 inch pound torque or 2 band 80 inch pound torque minimum). The gasket material shall be neoprene rubber meeting the requirements of ASTM C-564. Submittal to include copy of compliance to requirements of FM 1680 Class I by certified independent third party testing laboratory. No-Hub couplings shall be Mission Blue HW, Husky SD2000, or Clamp-All High Torq 80. No coupling reducing fittings allowed.

2. Below Ground: No-Hub couplings shall comply with requirements of Factory Mutual 1680 Class 1, 15 PSI rated pressure. No-Hub coupling shall be constructed of Type 304 stainless steel (28 gauge) with 305 stainless worn drive screws. The worm drive clamps shall have a hexagon head to accept a 3/8 inch socketed torque wrench. The clamps shall be tightened to a minimum of 80 inch pounds. (Single corrugated shield, 4 band 80 inch pound torque or 2 band 125 inch pound torque minimum). The gasket material shall be neoprene rubber meeting the requirements of ASTM C-564. Submittal to include copy of compliance to the requirements of FM 1680 Class 1, by certified independent third party testing laboratory. No-Hub couplings shall be Mission SUMO HW, Husky SD4000 or Clamp-All High Torq 125. No Coupling reducing fittings allowed.

C. Refer to geotechnical report for recommendations for corrosion protection. If soil is noted as “corrosive” or “moderately corrosive”, all underground cast iron drain piping shall be wrapped in a polyethylene wrapping conforming to AWWA C105-10, ANSI A21.5-10, ASTM D4976 and NT4112-10.

2.02 CLEANOUTS

A. Cleanouts shall be the same size as the pipe, up to 4 inches; and not less than 4 inches for larger pipe. Cleanouts shall be easily accessible and shall be gastight and watertight. Minimum clearance of 24 inches shall be provided for clearing a clogged sanitary line.

B. Floor cleanouts shall be gray iron housing with clamping device and round, secured, scoriated, gray iron cover conforming to ASME A112.36.2M. A gray iron ferrule with hubless, socket, inside calk or spigot connection and counter sunk, taper-thread, brass or bronze closure plug shall be included. The frame and cover material and finish shall be nickel-bronze copper alloy with a square shape. The cleanout shall be vertically adjustable for a minimum of 2 inches. When a waterproof membrane is used in the floor system, clamping collars shall be provided on the cleanouts. Cleanouts shall consist of wye fittings and eighth bends with brass or bronze screw plugs. Cleanouts in the resilient tile floors, quarry tile and ceramic tile floors shall be provided with square top covers recessed for tile insertion. In the carpeted areas, carpet cleanout markers shall

be provided. Two way cleanouts shall be provided where indicated on drawings and at every building exit. The loading classification for cleanouts in sidewalk areas or subject to vehicular traffic shall be heavy duty type.

C. Cleanouts shall be provided at or near the base of the vertical stacks with the cleanout plug located approximately 24 inches above the floor. If there are no fixtures installed on the lowest floor, the cleanout shall be installed at the base of the stack. The cleanouts shall be extended to the wall access cover. Cleanout shall consist of sanitary tees. Nickel-bronze square frame and stainless steel cover with minimum opening of 6 by 6 inche) shall be furnished at each wall cleanout. Where the piping is concealed, a fixture trap or a fixture with integral trap, readily removable without disturbing concealed pipe, shall be accepted as a cleanout equivalent providing the opening to be used as a cleanout opening is the size required.

D. In horizontal runs above grade, cleanouts shall consist of cast brass tapered screw plug in fitting or caulked/hubless cast iron ferrule. Plain end (hubless) piping in interstitial space or above ceiling may use plain end (hubless) blind plug and clamp.

2.03 TRAPS

A. Traps shall be provided on all sanitary branch waste connections from fixtures or equipment not provided with traps. Exposed brass shall be polished brass chromium plated with nipple and set screw escutcheons. Concealed traps may be rough cast brass or same material as pipe connected to. Slip joints are not permitted on sewer side of trap. Traps shall correspond to fittings on cast iron soil pipe or steel pipe respectively, and size shall be as required by connected service or fixture.

2.04 WATERPROOFING

A. A sleeve flashing device shall be provided at points where pipes pass through membrane waterproofed floors or walls. The sleeve flashing device shall be manufactured, cast iron fitting with clamping device that forms a sleeve for the pipe floor penetration of the floor membrane. A galvanized steel pipe extension shall be included in the top of the fitting that will extend 2 inches above finished floor and galvanized steel pipe extension in the bottom of the fitting that will extend through the floor slab. A waterproof caulked joint shall be provided at the top hub.

B. Walls: See detail shown on drawings.

PART 3 – EXECUTION

3.01 INSTALLATION

A. The pipe installation shall comply with the requirements of the California Plumbing Code (CPC) and these specifications.

B. Branch piping shall be installed for waste from the respective piping systems and connect to all fixtures, valves, cocks, outlets, casework, cabinets and equipment, including those furnished by the Government or specified in other sections.

C. Pipe shall be round and straight. Cutting shall be done with proper tools. Pipe shall be reamed to full size after cutting.

D. All pipe runs shall be laid out to avoid interference with other work.

E. The piping shall be installed above accessible ceilings where possible.

F. The piping shall be installed to permit valve servicing or operation.

G. Unless specifically indicated on the drawings, the minimum slope shall be 2% slope.

H. The piping shall be installed free of sags and bends.

I. Seismic restraint shall be installed where required by code.

J. Changes in direction for soil and waste drainage and vent piping shall be made using appropriate branches, bends and long sweep bends. Sanitary tees and short sweep quarter bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Long turn double wye branch and eighth bend fittings shall be used if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Proper size of standard increaser and reducers shall be used if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

K. Buried soil and waste drainage and vent piping shall be laid beginning at the low point of each system. Piping shall be installed true to grades and alignment indicated with unbroken continuity of invert. Hub ends shall be placed upstream. Required gaskets shall be installed according to manufacturer's written instruction for use of lubricants, cements, and other installation requirements.

L. Cast iron piping shall be installed according to the latest edition of CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings"

3.02 JOINT CONSTRUCTION

A. Hub and spigot, cast iron piping with gasket joints shall be joined in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

B. Hub and spigot, cast iron piping with calked joints shall be joined in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead and oakum calked joints.

C. Hubless or No-hub, cast iron piping shall be joined in accordance with CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless piping coupling joints.

D. For threaded joints, thread pipe with tapered pipe threads according to ASME B1.20.1. The threads shall be cut full and clean using sharp disc cutters. Threaded pipe ends shall be reamed to remove burrs and restored to full pipe inside diameter. Pipe fittings and valves shall be joined as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is required by the pipe service

2. Pipe sections with damaged threads shall be replaced with new sections of pipe.

3.03 SPECIALTY PIPE FITTINGS

A. Transition coupling shall be installed at pipe joints with small differences in pipe outside diameters.

B. Dielectric fittings shall be installed at connections of dissimilar metal piping and tubing.

3.04 PIPE HANGERS, SUPPORTS AND ACCESSORIES

A. All piping shall be supported according to the California Plumbing Code (CPC) and these specifications. Where conflicts arise between the documents and the code, the most restrictive or the requirement that specifies supports with highest loading or shortest spacing shall apply.

B. Hangers, supports, rods, inserts and accessories used for pipe supports shall be shop coated with zinc chromate primer paint. Electroplated copper hanger rods, hangers and accessories may be used with copper tubing.

C. Horizontal piping and tubing shall be supported within 12 inches of each fitting or coupling.

D. Horizontal cast iron piping shall be supported with the following maximum horizontal spacing and minimum hanger rod diameters:

1. NPS 1-1/2 inch to NPS 2 inch: 60 inches with 3/8 inch rod.

2. NPS 3 inch: 60 inches with ½ inch rod.

3. NPS 4 to NPS 5: 60 inches with 5/8 inch rod.

E. The maximum spacing for plastic pipe shall be 4 feet.

F. Vertical piping and tubing shall be supported at the base, at each floor, and at intervals no greater than 15 feet.

G. In addition to the requirements in Section 22 00 00, floor, Wall and Ceiling Plates, Supports, Hangers shall have the following characteristics:

1. Solid or split un-plated cast iron.

2. All plates shall be provided with set screws.

3. Height adjustable clevis type pipe hangers.

4. Adjustable floor rests and base flanges shall be steel.

5. Hanger rods shall be low carbon steel, fully threaded or threaded at each end with two removable nuts at each end for positioning rod and hanger and locking each in place.

H. Miscellaneous materials shall be provided as specified, required, directed or as noted on the drawings for proper installation of hangers, supports and accessories. If the vertical distance exceeds 20 feet for cast iron pipe additional support shall be provided in the center of that span. All necessary auxiliary steel shall be provided to provide that support.

I. Cast escutcheon with set screw shall be provided at each wall, floor and ceiling penetration in exposed finished locations and within cabinets and millwork.

J. Piping shall conform to the following:

1. Waste and Vent Drain to main stacks:

a. All: 2%

3.05 TESTS

A. Sanitary waste and drain systems shall be tested either in its entirety or in sections.

B. Waste System tests shall be conducted before trenches are backfilled or fixtures are connected. A water test or air test shall be conducted, as directed.

1. If entire system is tested for a water test, tightly close all openings in pipes except highest opening, and fill system with water to point of overflow. If the waste system is tested in sections, tightly plug each opening except highest opening of section under test, fill each section with water and test with at least a 10 foot head of water. In testing successive sections, test at least upper 10 feet of next preceding section so that each joint or pipe except upper most 10 feet of system has been submitted to a test of at least a 10 foot head of water. Water shall be kept in the system, or in portion under test, for at least 15 minutes before inspection starts. System shall then be tight at all joints.

2. For an air test, an air pressure of 5 psig gage shall be maintained for at least 15 minutes without leakage. A force pump and mercury column gage shall be used for the air test.

3. After installing all fixtures and equipment, open water supply so that all p-traps can be observed. For 15 minutes of operation, all p-traps shall be inspected for leaks and any leaks found shall be corrected.

4. Final Tests:

a. Smoke Test: After fixtures are permanently connected and traps are filled with water, fill entire drainage and vent systems with smoke under

pressure of 1.3 kPa (1 inch of water) with a smoke machine. Chemical smoke is prohibited.

END OF SECTION

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SECTION 22 40 00

PLUMBING FIXTURES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Include all labor, materials, tools, equipment and services required to furnish, deliver and install all work under this Section as required by the Contract Drawings and as specified herein.

B. Following is a brief outline descriptive of the work included, but shall not be considered as complete and all inclusive.

1. Plumbing Fixtures

2. Plumbing Fixture Carriers

3. Trim

4. Accessories

PART 2 – PRODUCTS

2.01 GENERAL:

A. Vitreous china fixtures shall conform to ANSI A112.192; stainless steel fixtures shall conform to ANSI A112.193; acid resisting enameled cast iron fixtures shall conform to ANSI A112.19.1; fixture supports shall conform to ANSI A117.1.

B. All exposed piping, fittings, traps, escutcheons, valves and accessories shall be polished chrome plated brass construction.

C. Locations and elevations of all fixtures shall be as shown on the Architectural Drawings.

D. Force to activate all handicapped accessible fixture controls shall be no greater than 5 lbs.

E. Self closing faucets shall remain open for at least 10 seconds when activated unless otherwise specified.

F. No sharp or abrasive surfaces shall be allowed under lavatories or wash fountains. Hot water and drain pipes exposed under lavatories and sinks shall be insulated (2010 CBC 1134A.8, 6)

2.02 STOPS

A. Provide lock-shield loose key or screw driver pattern angle stops, straight stops or stops integral with faucet, with each compression type faucet whether specifically called for

or not, including sinks in wood and metal casework, laboratory furniture and pharmacy furniture. Locate stops centrally above or below fixture in accessible location.

B. Furnish keys for lock shield stops to Engineer of Record.

C. Supply from stops not integral with faucet shall be chrome plated copper flexible tubing or flexible stainless steel with inner core of non-toxic polymer.

D. Supply pipe from wall to valve stop shall be rigid threaded IPS copper alloy pipe, i.e. red brass pipe nipple.

2.03 ESCUTCHEONS

A. Heavy type, chrome plated, with set screws. Provide for piping serving plumbing fixtures and at each wall, ceiling and floor penetrations in exposed finished locations and within cabinets and millwork.

2.04 LAMINAR FLOW CONTROL DEVICE

A. Smooth, bright stainless steel or satin finish, chrome plated metal laminar flow device shall provide non-aeration, clear, coherent laminar flow that will not splash in basin. Device shall also have a flow control restrictor and have vandal resistant housing.

B. Flow Control Restrictor:

1. Capable of restricting flow to 0.35 gpm for lavatories; 0.5 to 1.5 gpm for sinks and 2.75 to 3.0 gpm for dietary food preparation and rinse sinks.

2. Compensates for pressure fluctuation maintaining flow rate specified above within 10 percent between 25 and 80 psi.

3. Operates by expansion and contraction, eliminates mineral/sediment build-up with self-clearing action, and is capable of easy manual cleaning.

2.05 CARRIERS

A. ASME/ANSI A112.6.1M, with adjustable gasket faceplate chair carriers for wall hung closets with auxiliary anchor foot assembly, hanger rod support feet, and rear anchor tie down.

B. ASME/ANSI A112.6.1M, lavatory, chair carrier for thin wall construction or steel plate as detailed on drawing. All lavatory chair carriers shall be capable of supporting the lavatory with a 250-pound vertical load applied at the front of the fixture.

C. Where water closets, lavatories or sinks are installed back-to-back and carriers are specified, provide one carrier to serve both fixtures in lieu of individual carriers. The drainage fitting of the back to back carrier shall be so constructed that it prevents the discharge from one fixture from flowing into the opposite fixture.

2.06 FIXTURES

A. DF-1 DRINKING FOUNTAIN

1. Fixture: Haws Model 1117L "Hi-Lo" wall mounted barrier free drinking fountain shall include dual 18 gauge Type 304 Stainless Steel satin finish basins with integral swirl design, 14 gauge Type 304 Stainless Steel wall bracket, 100% lead-free waterways, push-button operated stainless steel valves with front-accessible cartridge and flow adjustment, polished chrome-plated brass vandal-resistant bubbler heads with integral laminar anti-squirt flow, chrome-plated brass vandal-resistant waste strainers, vandal-resistant bottom plates, stainless steel satin finish back panel, high and low fountain mounting levels, and 1-1/4" O.D. (3.2 cm) waste pipes. (P-trap and stop require rear access). Coordinate mounting height with Architectural drawings.

2. Accessories: Haws universal in-wall mounting support for use with Model 1117L.

B. L-1 LAVATORY

1. Fixture: American Standard “Declyn” #0321.075 lavatory system, white vitreous china wall-mounted lavatory. Rear overflow, soap depression and faucet ledge.

2. Faucet: American Standard “Monterrey” 6114.116.002 single control lever handle. Faucet shall be cast bronze, less pop-up drain and pressure-compensating non-aerated 0.5 GPM spray.

3. Drain: Zurn model Z-8737 flat grid strainer, chrome plated, 20 gauge tail-piece and cast-brass lock nut and coupling nut.

4. Carrier: Zurn model Z-1231 concealed arm carrier with Dura-Coated rectangular steel uprights with welded feet, cast iron adjustable headers, concealed arms, steel sleeves, alignment truss and mounting fasteners.

C. HB-1

1. Fixture: Chicago #387-RCF interior hose bibb. Sill fittings, 2-1/4” tee handle.

D. SK-1 SINK

1. Fixture: Just #SL-ADA-2131-A-GR, single bowl ADA compliant. 18-8 gauge Type 304 stainless steel, self-rimming. Polished non-porous hand-blended finish. Fully coated underside for sound and condensate reduction.

2. Faucet: Just J-1174-KS concealed ledge-mount faucet. Swiveling gooseneck with 5-1/2” span. Brass quarter turn quick

compression stem units. 4" chrome plated color coded wrist blade handles.

3. Drain: Just J-ADA-35-SSF stainless steel strainer.

E. WC-1 WATER CLOSET

1. Fixture: American Standard #288DA.114 vitreous china. Ultra high efficiency (1.1 gpf). 16-1/2" rim height. Provide with self-sustaining check hinged toilet seat.

PART 3 – EXECUTION

3.01 INSTALLATION

A. All exposed piping, fittings, traps, escutcheons, valves and accessories shall be polished chrome plated brass construction.

B. Locations and elevations of all fixtures shall be as shown on the Architectural Drawings and as required for ADA compliance.

C. Each fixture shall be separately controlled with loose key handles or stops except for mop sink faucets which shall have integral stops.

D. Force to activate all handicapped accessible fixture controls shall be no greater than 5 lbs.

E. No sharp or abrasive surfaces shall be allowed under and ADA compliant fixture.

F. All carriers for plumbing fixtures shall be bolted to the floor.

G. Install all fixtures and equipment according to the manufacturers' written instructions, and in good workmanship.

H. The Contractor shall be responsible for protecting against injury from building materials, acid, tools, equipment, etc., all plumbing fixtures included in these specifications.

I. Upon completion of installation, fixtures shall be cleaned, left in first class condition and in good working order.

J. Where water closet waste pipe has to be offset due to beam interference, provide correct and additional piping necessary to eliminate relocation of water closet.

K. Toggle Bolts: For hollow masonry units, finished or unfinished.

L. Expansion Bolts: For brick or concrete or other solid masonry. Shall be 1/4-inch diameter bolts, and to extend at least 3-inches into masonry and be fitted with loose tubing or sleeves extending into masonry. Wood plugs, fiber plugs, lead or other soft metal shields are prohibited.

M. Spaces between wall mounted fixtures and wall surfaces shall be neatly pointed up with non-shrinking no stain water resistant caulking with a color to match the fixture or surface mounted to. Any other color besides white shall be approved by the Architect prior to construction.

END OF SECTION

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DIVISION 32

EXTERIOR IMPROVEMENTS

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SECTION 32 17 13

PARKING BUMPERS

1 GENERAL

1. SUMMARY

a. Section includes wheel stops.

2. ACTION SUBMITTALS

a. Product Data: For each type of product.

b. Samples: For each exposed product and for each color and texture specified.

2 PRODUCTS

1. PARKING BUMPERS

a. Concrete Wheel Stops: Precast, steel-reinforced, air-entrained concrete, 4000-psi minimum compressive strength, 4-1/2 inches high by 9 inches wide by 72 inches long. Provide chamfered corners, transverse drainage slots on underside, and a minimum of two factory-formed or -drilled vertical holes through wheel stop for anchoring to substrate.

1) Mounting Hardware: Galvanized-steel hardware as standard with wheel-stop manufacturer.

3 EXECUTION

1. INSTALLATION

a. General: Install wheel stops according to manufacturer's written instructions unless otherwise indicated.

b. Install wheel stops in bed of adhesive before anchoring.

c. Securely anchor wheel stops to pavement with hardware in each preformed vertical hole in wheel stop as recommended in writing by manufacturer.

END OF SECTION

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SECTION 32 17 23
PAVEMENT MARKINGS

1 GENERAL

1. SUMMARY

a. Section includes painted markings applied to asphalt pavement.

2. ACTION SUBMITTALS

a. Product Data: For each type of product.

b. Samples: For each exposed product and for each color and texture specified.

2 PRODUCTS

1. PAVEMENT-MARKING PAINT

a. Pavement-Marking Paint: MPI #32, alkyd traffic-marking paint.

1) Color: White, Blue.

b. Pavement-Marking Paint: MPI #97, latex traffic-marking paint.

1) Color: White, Blue.

EXECUTION

2. PAVEMENT MARKING

a. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

b. Allow paving to age for a minimum of 30 days before starting pavement marking.

c. Sweep and clean surface to eliminate loose material and dust.

d. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

1) Apply graphic symbols and lettering with paint-resistant, die-cut stencils. Apply paint so that it cannot run beneath the stencil.
2) Broadcast glass beads uniformly into wet markings at a rate of 6 lb/gal.

END OF SECTION

SECTION 32 17 26
TACTILE WARNING SURFACING

1 GENERAL

1. SUMMARY

a. Section Includes:
1) Detectable warning mats applied to existing concrete paving.

2. ACTION SUBMITTALS

a. Product Data: For each type of product.

b. Samples for each type of exposed finish requiring color selection.

2 PRODUCTS

1. TACTILE WARNING SURFACING, GENERAL

a. Accessibility Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for tactile warning surfaces.

1) For tactile warning surfaces composed of multiple units, provide units that when installed provide consistent side-to-side and end-to-end dome spacing that complies with requirements.

2. DETECTABLE WARNING MATS

a. Surface-Applied Detectable Warning Mats: Accessible truncated-dome detectable warning resilient mats, UV resistant, manufactured for adhering to existing concrete walkway surfaces, with slip-resistant surface treatment on domes, field of mat, and beveled outside edges.

1) Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a) AlertTile; a division of Cape Fear Systems, II, LLC.

2) Material: Modified rubber compound, UV resistant.

3) Color: As indicated by manufacturer's designations .
4) Shapes and Sizes:

a) Rectangular panel, 24 by 36 inches.

5) Dome Spacing and Configuration: Manufacturer's standard compliant spacing in manufacturer's standard pattern.
6) Mounting: Adhered to pavement surface with adhesive.

3. ACCESSORIES

a. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of tactile warning surfaces, noncorrosive and compatible with each material joined, and complying with the following:

1) Furnish Type 304 stainless-steel fasteners for exterior use.
2) Fastener Heads: For nonstructural connections, use flathead or oval countersunk screws and bolts with tamper-resistant heads, colored to match tile.

b. Adhesive: As recommended by manufacturer for adhering tactile warning surfacing unit to pavement.

c. Sealant: As recommended by manufacturer for sealing perimeter of tactile warning surfacing unit.

3 EXECUTION

1. INSTALLATION OF TACTILE WARNING SURFACING

a. General: Prepare substrate and install tactile warning surfacing according to manufacturer's written instructions unless otherwise indicated.

b. Place tactile warning surfacing units in dimensions and orientation indicated. Comply with location requirements of AASHTO MP 12.

c. Cast-in-Place Detectable Warning Tiles: Set each detectable warning tile accurately and firmly in place and completely seat tile back and embedments in wet concrete by tamping or vibrating. Set surface of tile flush with surrounding concrete and adjacent tiles. Remove concrete from tile surfaces and clean using methods recommended in writing by manufacturer.

d. Removable Cast-in-Place Detectable Warning Tiles: Set each detectable warning tile accurately and firmly in place with embedding anchors and fasteners attached, and firmly seat tile back in wet concrete by tamping or vibrating. Set surface of tile flush with surrounding concrete and adjacent tiles. Remove concrete from tile surfaces and clean tiles using methods recommended in writing by manufacturer.

e. Surface-Applied Detectable Warning Tiles: Prepare existing paving surface by grinding and cleaning as recommended by manufacturer. Apply adhesive to back of tiles in amounts and pattern recommended by manufacturer, and set tiles in place. Install anchor devices through face of tiles and into pavement using anchors located as recommended by manufacturer. Apply sealant in continuous bead around perimeter of installation.

f. Surface-Applied Detectable Warning Mats: Prepare existing paving surface by grinding and cleaning as recommended by manufacturer. Apply adhesive to back of mat and set mat in place. Firmly seat mat in adhesive bed. Install anchor devices through face of mat and into pavement using anchors

located as recommended by manufacturer. Set heads of anchors flush with mat surface. Apply sealant in continuous bead around perimeter of mat.

g. Remove and replace tactile warning surfacing that is broken or damaged or does not comply with requirements in this Section. Remove in complete sections from joint to joint unless otherwise approved by Architect. Replace using tactile warning surfacing installation methods acceptable to Architect.

h. Protect tactile warning surfacing from damage and maintain free of stains, discoloration, dirt, and other foreign material.

END OF SECTION