



PROJECT MANUAL
For
HOLLISTER HILLS SVRA
Office Expansion
San Benito County, California

June 2009

VOLUME 1 OF 2



STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF PARKS AND RECREATION

CALIFORNIA DEPARTMENT OF PARKS AND RECREATION

CONTRACT DOCUMENTS

HOLLISTER HILLS STATE VEHICLE RECREATION AREA Office Expansion

SAN BENITO COUNTY, CA



May 2009



DPR ACCESS COMPLIANCE REVIEW
ACCESSIBILITY SECTION

Certification # 09-025
Shawn B. Smith, CASp-029
Reviewer Date 5/13/09

DEPARTMENT OF PARKS AND RECREATION

SMALL BUSINESS NOTICE

Your business may now qualify for "Small Business" Certification with the State of California! On January 1, 1999, the legal definition of "small business" changed, making it possible for more small businesses to qualify for this valuable certification.

Your firm may now be eligible if it meets all of the following:

- Annual receipts averaging \$10 million or less over the previous three years?
(Note: manufacturers do not have to meet this criteria)
- One hundred or fewer employees?
- Is your firm's principal office located in California, and its owners and officers living in California?
- Is it independently owned and operated?

The State of California Department of General Services, Procurement Division, Office of Small Business and DVBE Services (OSDS) offers many services that assist both contracting state agencies and contractors/business owners with a variety of information designed to streamline the state contracting process. For example, certified Small Businesses (SB) and Disabled Veteran Business Enterprises (DVBEs) are now listed at no charge on OSDS' website so state contracting officials can easily contact them to verify certification status and to develop referral lists for use by contractors bidding on state contracts. ***Please note most DVBEs also qualify for "Small Business" certification.***

On the OSDS website, the California State Contracts Register (CSCR) electronically announces contracting opportunities daily. One of many new services available to all businesses, the Subscription Outreach Service (SOS), sends firms notices (fax or e-mail) of California government contracting opportunities that match the services and products they provide. Contractors are able to complete a "profile" of their business, and OSDS forwards contracting opportunities that fit the contractor's specific profile. Please check out this and many other services in greater detail on OSDS' website: <http://www.pd.dgs.ca.gov/smbus>.

The Department of Parks and Recreation (DPR) welcomes all its contractors and suppliers as business partners and thanks them for supporting its mission to provide for the health, inspiration, and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation. DPR's mission is further enhanced by the goods and services you provide.

What is the Small Business Preference?

A five (5%) percent preference will be granted to the bidder properly approved as "Small Business" in accordance with Title 2, California Code of Regulations, Section 1896, et seq. A small business firm must have an approved certification form (STD 813) on file with the Department of General Services, Small Business and DVBE Services, 707 Third Street, First Floor - Room 400, West Sacramento, CA 95605, by 5:00 p.m. on the bid opening date.

To assist the Department in a timely evaluation of bids received, any bidder requesting the small business preference is encouraged to submit with the bid a copy of his/her small business certification approval letter from OSDS.

How does the 5% Small Business Preference Work?

The following example shows how the 5% preference computation works, and how it is used to determine a successful bidder.

Bidder	Bid Amount	Bid After Preference	Small Business Status
1	\$30,750	\$30,750	Claims small business status, but <i>is not</i> OSBDS-certified.
2	\$28,975	\$28,975	Does not claim to be small business.
3	\$29,520	\$29,520	Claims small business status, but <i>is not</i> OSBDS-certified.
4	\$29,870	\$28,421	Claims small business status and <i>is</i> OSBDS-certified.

Computation Method

Five percent is applied to the lowest (non-certified small business) responsible bid
([Bidder 2] \$28,975 x .05 = \$1448.75).

The preference amount (\$1,448.75) is subtracted from the certified small business (Bidder 4's) bid amount (\$29,870 - \$1,448.75 = \$28,421.25).

Bidder 4's computed total is \$28,421.25, making them the lowest bidder.

The contract is awarded to Bidder 4 for \$29,870.

Notes: The five percent bid preference **does not apply** when the certified small business is the lowest bidder. Also, the 5% preference is used only for computation purposes to determine the successful bidder and **does not alter the amounts of the actual bids**.

Contact OSDS to find out more:

The State of California
Department of General Services
Office of Small Business and DVBE Services
707 Third Street, First Floor - Room 400
West Sacramento, CA 95605

www.pd.dgs.ca.gov/smbus
Receptionist: (916) 375-4940
24-hour recording (916) 322-5060
FAX: (916) 375-4950

**NOTICE OF
Disabled Veteran Business Enterprise (DVBE)
INCENTIVE PROGRAM
for Invitation For Bids (IFB)**

Your bid may qualify for the DVBE Incentive Program.

What is the DVBE Incentive Program?

The DVBE Incentive Program was established by statute and applies to contracts solely financed by State funds. This program is separate from the DVBE Participation Program. The incentive is designed to encourage bidders to partner with DVBE subcontractors. The incentive may be combined with other incentives and preferences up to the established cap of \$100,000.00. ***The incentive is used only for evaluation purposes to arrive at the successful bidder and does not alter the amounts of the actual bids.***

Who is eligible to receive the incentive?

Any responsive and responsible bidder with an eligible amount of DVBE participation per Table A below.

Who is not eligible for the incentive?

Bidders who do not gain enough DVBE participation per Table A below and bidders who are not responsive and responsible regardless of the amount of DVBE participation.

How does the DVBE Incentive Program Work?

Table A – IFB (aka Low Price Method)

Confirmed DVBE Participation of	DVBE Incentive Amount for IFB
6% or more	5% of lowest responsive and responsible bid
Good Faith Effort (GFE) is required if less than 6 % DVBE participation is achieved	
5% - 5.99%	4% of lowest responsive and responsible bid
4% - 4.99%	3% of lowest responsive and responsible bid
3% - 3.99%	2% of lowest responsive and responsible bid
Less than 3%	N/A

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Computation Method

The DVBE incentive is used only for evaluation purposes to arrive at the successful bidder and does not alter the amounts of the actual bids. A dollar cap of \$100,000.00 is set for all combined incentives and preferences.

For contracts awarded based on the Low Price Method, the incentive amount is equal to a percentage of the **lowest responsive and responsible bid** based on the amount of DVBE participation in the bid being evaluated per Table A above. Example 1 does not include the small business preference; however, the small business preference may be applied and may affect the application of the incentive and the outcome of the ranking.

Example 1 –Low Price Method

Bidder Name	A	B	C
Original Bid Price	\$98,000.00	\$102,100.00	\$100,000.00
DVBE Participation for certified DVBE Prime or Subcontractors	2%	8%	4.5%
5 steps of GFE	No	n/a	Yes
Initial Ranking	Unresponsive	2	1
DVBE Incentive (from Table A)	n/a	5%	3%
Incentive Amount (% times lowest responsive and responsible bid price)	n/a	\$5,000.00 (5% x \$100,000)	\$3,000.00 (3% x \$100,000)
Adjusted Bid Price (bidder's price minus bidder's incentive amount)	n/a	\$97,100.00 (\$102,100-\$5,000)	\$97,000.00 (\$100,000-\$3,000)
Final Rank	Unresponsive	2	1

OFFICE OF SMALL BUSINESS AND DVBE SERVICES

The State of California, Department of General Services, Procurement Division, Office of Small Business and DVBE Services (OSDS) offers many services that assist contractor/business owners with a variety of information designed to streamline the State contracting process. OSDS also certifies DVBE contractors. For more information, please:

Contact OSDS to find out more:

The State of California
Department of General Services
Office of Small Business and DVBE Services
707 Third Street, First Floor – Room 400
West Sacramento, CA 95605

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THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF PARKS AND RECREATION
HOLLISTER HILLS SVRA
Office Expansion
San Benito County, California

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HOLLISTER HILLS SVRA

Office Expansion

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State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

**PUBLIC WORKS
NOTICE TO CONTRACTORS**

HOLLISTER HILLS SVRA
Office Expansion
San Benito County, California

Sealed bids will be received at the office of the Department of Parks and Recreation, One Capitol Mall, Suite 410, Sacramento, CA 95814, **up to 2 p.m., Tuesday, June 9, 2009**, at which time and place they will be publicly opened and read for performing the work as follows:

Furnish all labor, materials, tools and equipment necessary to remodel the Ranger Resources Office building and expand and remodel the Administrative Office Building at **HOLLISTER HILLS SVRA**, San Benito County, California, complete and in accordance with the plans and specifications therefore and such addenda thereto as may be issued prior to bid opening date.

License required: A or B

Engineer's Estimate: \$364,130

NOTE: There is no job showing.

DVBE participation is required yet DVBE advertising will be waived for this project only.

The bidder agrees to complete all work within **ONE HUNDRED EIGHTY (180)** calendar days from the date of written notice to commence work. This time includes ten (10) calendar days allowed for the contractor to begin work.

Prospective bidders may examine and obtain the bid forms, specifications, plans and addenda (if any) by downloading this bid package from the Department of General Services' (DGS) website at <http://www.eprocure.dgs.ca.gov/CSCRAAds.htm>. At the website in the middle of the page for the first SEARCH pane, enter the following Bid Number: **C3210003**. Then select the option for "Bid Number", select the "Search" button, and select Park/Project description link to view the full advertisement. The bid package is also available on CD, free of charge, and can be obtained by faxing a request to (916) 445-9027. The CD will be sent by first class mail, unless a FedEx number is provided with the fax request. Any discrepancies, omissions, ambiguities, or conflicts in or among the contract documents or doubts as to meaning shall be brought to the State's attention by email to Plans Counter at planscounter@parks.ca.gov or FAX to (916) 445-9027 no later than 5 p.m., seven (7) calendar days prior to bid opening date.

It is the responsibility of the bidders to download any addendum as needed.

No bid will be considered unless it is made on a standard bid form furnished by the Department of Parks and Recreation, and is made in accordance with the "Instructions to Bidders".

Bids must be submitted for the entire work as described herein. The Department of Parks and Recreation reserves the right to waive any irregularity in a bid or to reject any or all bids.

The apparent low bidder will be required to execute a contractual agreement in the form of a "Standard Agreement - Form 213" which shall be binding upon the State of California only upon approval by the State.

Bond requirements for contracts exceeding \$5,000 are stated in the General Conditions, DPR 483, Section 00700.

In accordance with the provisions of Section 1770, 1773 and 1773.1 of the Labor Code, the Department has ascertained that the general prevailing rate of wages in the county in which the work to be done be as listed by the Department of Industrial Relations (415) 703-4780. A copy of this listing is on file at the address listed above or at www.dir.ca.gov.

Participation in Small Business Preference Program: Preference will be granted to bidder properly approved as "Small Business" in accordance with Section 1896, et seq., Title 2, California Code of Regulations. A small business firm must have an approved certification form (STD. 813) on file at the Office of Small Business and DVBE Services, 707 Third Street, First Floor – Room 400, West Sacramento, California 95605, by 5:00 p.m. of bid opening date (website address: <http://www.eprocure.dgs.ca.gov/default.htm>). If bidder wants "Small Business" preference on this project, bidder must sign STD. 811 form (Small Business Preference and Certification Request) and submit with bid.

Non-Small Business Preference

A five percent (5%) bid preference is available to a non-small business proposing firms claiming twenty-five percent (25%) California certified small business subcontractor participation. If claiming the non-small business subcontractor preference, the proposal must include a list of the small business(es) with which you commit to subcontract in an amount of at least twenty-five percent (25%) of the net bid price with one or more California certified small businesses. Each listed certified small business must perform a "commercially useful function" in the performance of the contract as defined in Government Code Section 14837(d)(4). **Indicate in your Proposal whether or not you are claiming the non-small business preference.** The required list of California certified small business subcontracts must be attached to the proposal and must include the

following: 1) subcontractor name, 2) address, 3) phone number, 4) a description of the work to be performed and/or products supplied, 5) and the dollar amount or percentage of the net bid price (as specified in the solicitation) per subcontractor.

Proposers claiming the five percent (5%) preference must commit to subcontract at least twenty-five percent (25%) of the net bid price with one or more California certified small businesses. Completed certification applications and required support documents must be submitted to the office of Small Business and DVBE Services (OSDS) no later than 5:00 p.m. on the bid due date, and the OSDS must be able to approve the application as submitted. Questions regarding certification should be directed to the OSDS at (916) 375-4940.

Participation in Disabled Veteran Enterprise Program: All DPR contracts over \$10,000 shall have a participation goal of not less than 6% for Disabled Veteran Business Enterprises. **ALL REFERENCES ON THE STD 840, DOCUMENTATION OF DVBE PROGRAM REQUIREMENTS, THAT REFER TO 3% PARTICIPATION ARE HEREBY AMENDED TO READ 6%.** In addition to other contracting requirements, to qualify as a responsive bidder, the bidder must either certify that the required goal has been achieved, or demonstrate that a good faith effort was made to meet the goal. Note: Ads must be published at least 14 days prior to the bid due date (refer to Page 3 of the DVBE requirements).

DVBE Incentive: For evaluation purposes only, an incentive will be given to bidders who meet the DVBE requirements, either through achieving the 6% DVBE participation or achieving less than the minimum 6% DVBE participation and completing a Good Faith Effort.

Notice of Requirement for Nondiscrimination Program: Your attention is called to the "Nondiscrimination Clause" set forth or referred to herein, which is applicable to all nonexempt State construction contracts, and subcontracts, and to the "Standard California Nondiscrimination Construction Contract Specifications" set forth herein. (Refer to General Conditions at www.ols.dgs.ca.gov/Standard+Language.)

DEPARTMENT OF PARKS AND RECREATION
Ruth G. Coleman, Director

SECTION 00100
PUBLIC WORKS
INSTRUCTIONS TO BIDDERS

PART 1. GENERAL

1.01 EXAMINATION OF BID DOCUMENTS AND SITE

- A. *Bidder shall carefully examine and thoroughly acquaint himself/herself with the conditions at the site of the work, the plans, the specifications and the provisions contained in the project manual. He/she shall investigate conditions character, quality and quantity of surface, and sub-surface materials of obstacles to be encountered. Failure by the bidder to acquaint himself/herself with site conditions and available information will not relieve him/her from the responsibility for estimating properly the difficulty or cost of successfully performing the work. The submission of a bid will be considered as conclusive evidence that the bidder has made such examination.*
- B. Questions pertaining to the Plans and Specifications which may arise during the bidding period shall be directed to the Department of Parks and Recreation office listed in the Notice to Contractors.

1.02 DISCREPANCIES

- A. Any discrepancies, omissions, ambiguities, or conflicts in or among the contract documents or doubts as to meaning shall be brought to the state's attention not later than seven days prior to bid opening date.
- B. All interpretations and clarifications will be in the form of written addenda. All bidders are responsible to inquire as to addenda issued. All addenda become part of the contract documents. Any oral representations issued shall be of no force or effect.

1.03 BIDS AND BIDDERS

- A. Before submitting bids, all bidders must be licensed in the appropriate classification in accordance with provisions in Chapter 9, Division 3, of the "California Business and Professions Code" as amended.

No bidder may bid on work of a kind for which he/she is not properly licensed by the Contractors State License Board, and any such bid received will be rejected. Joint venture bidders must possess a joint venture license.
- B. State shall not award a contract to a bidder, nor shall a bidder be eligible to bid for or receive a contract, who has, in the preceding five years, been convicted of violating a state or federal law respecting the employment of undocumented aliens.
- C. Bids shall be signed and submitted on the Bid Form provided and shall be filled out in the same name style, manner and license number as bidder is licensed with the Contractors State License Board.
- D. Each bid shall have listed therein the name, address, license number and portion of the work of each subcontractor to whom the bidder proposes to subcontract portions of the work in an amount in excess of 1/2 of 1 percent of the total bid in accordance with the "Subletting and Subcontracting Fair Practices Act," commencing with Section 4100 of the Public Contract Code. The contractor agrees that he/she is fully qualified to perform that portion of the work, and that he/she shall perform that portion of the work for which a subcontractor has not been listed.
- E. Bids exceeding \$5,000 shall have enclosed cash, a cashier's check, certified check, or a bidder's bond, executed as surety by a corporation authorized to issue surety bonds in the State of California, made payable to "Director of Parks and Recreation," in an amount equal to at least 10 percent of amount of bid. No such bid shall be considered unless one of the forms of bidder's security is enclosed therewith. If bidder's security is a bidder's bond, it must be executed on a form approved by the state. Personal checks are not acceptable.

Within 10 days after the contract award the Department of Parks and Recreation will return all bidder's security, other than bidder's bonds, accompanying proposals that are not to be further considered in making the award. Retained bidder's security will be held until the contract has been fully executed, after which all bidder's security, except bidder's bonds, will be returned.

- F. Bids shall not be qualified. Any proposal modifying the conditions of the bid will be disregarded, or will be cause for rejection of the bid. Deviations from the Plans and Specifications shall not be considered and shall be cause for rejection of the bid.
- G. Bids shall include the cost of all items shown on the Plans, mentioned in the Specifications, or reasonably inferred therefrom as necessary to complete the work within the intent of the contract documents.
- H. Bid shall include all applicable federal, state and other taxes, together with the cost of all permits, licenses and the like, which may be required under various laws and regulations.
- I. Amounts shall be written in figures.
- J. Bids shall be submitted in an envelope using the pre-addressed label provided with the bidders checklist. This envelope shall be sealed and delivered to the place shown prior to the time and date for the bid opening. This envelope must have the return address of the bidder. It is the responsibility of the bidder to see that his/her bid is received in proper time. Facsimile (FAX) responses will not be considered.
- K. No bids will be accepted after the time set for the bid opening.
- L. Bids will be opened and read publicly at the time set for the bid opening, or as soon as practicable thereafter.
- M. Any bid may be withdrawn prior to the time fixed in the Notice to Contractors for submitting bids, provided a request for withdrawal is submitted in writing, signed by the bidder or his duly authorized representative and filed at or faxed to the place shown on the Notice to Contractors. *An oral, telegraphic, or telephonic request to withdraw or alter a bid proposal is not acceptable.*
- N. No bid may be withdrawn after the time fixed in the Notice to Contractors for submitting bids.
- O. No bids shall be considered unless a sworn statement is executed by the bidder on the form provided by the state titled "NONCOLLUSION AFFIDAVIT TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID FOR PUBLIC WORKS," DPR 837, and submitted with the bid. BIDDER'S SIGNATURE ON THE FORM MUST BE NOTARIZED.
- P. In the case of a tie bid, the determination of a successful bidder will be made by a coin toss in the presence of all interested bidders, at a time and date set by the state.
- Q. Bids exceeding \$10,000 shall meet the Disabled Veteran Business Enterprise (DVBE) participation goal or bidders shall make a good faith effort to meet this goal as prescribed herein.

1.04 CONTRACT

- A. **Bids shall remain valid for 120 calendar days after the bid opening date:** The State will endeavor to execute a contract within 120 calendar days from the bid opening date. The contract is not executed until the appropriate State agency has approved the contract. Bidders shall hold their bids for 120 calendar days after the bid opening date. Upon expiration of 120 calendar days from the bid opening date, bidders may withdraw their bids. If bidder, after expiration of 120 calendar days from the bid opening fails to withdraw its bid and a contract is subsequently approved by the appropriate State agency and executed, bidder shall have no claim for any reason to amend its bid.
- B. If the contract is awarded, it will be awarded to lowest responsible bidder whose bid complies with all prescribed requirements, which may include a "Small Business Bidder" in accordance with California Code of Regulations, Title 2, Section 1896 et seq.
- C. The apparent low bidder, in order to qualify as the lowest responsible bidder, will be required to execute and deliver to the state the required contract documents.

- D. The apparent low bidder shall execute the required number of copies of the contract documents and return them within seven (7) days, not including Saturdays, Sundays and Legal Holidays, after he/she has received notice that he/she is the apparent low bidder. Signature of the apparent low bidder on the contract documents will complete identification of these documents.

Failure to provide the required executed contract documents within the seven (7) days, not including Saturdays, Sundays and Legal Holidays may be deemed refusal of an award which shall be cause for forfeiture of bidder's security.

The state may award to the next lowest responsible bidder and avail itself of all legal remedies provided by statute.

- E. The contract shall be binding upon the state only after approval by the state. Should work begin in advance of receiving notice that the Contract is approved, that work shall be considered as having been done by a volunteer and Contractor shall go unpaid.

1.05 CERTIFICATE OF INSURANCE

The contractor shall furnish a Certificate of Insurance to the state as described in General Conditions, DPR 483, Section 00700.

1.06 CALIFORNIA PUBLIC CONTRACT CODE SECTION 10162 QUESTIONNAIRE

Bidder shall be required to submit a DPR 20 (California Public Contract Code Section 10162 Questionnaire) for bids that exceed \$147,000. Failure to submit this form with the bid shall not be cause for rejection; however, bidders must furnish the completed form within the time frame prescribed by the Department of Parks and Recreation. Failure to submit the required information within the time frame prescribed by the Department of Parks and Recreation may be deemed refusal of an award which shall be cause for forfeiture of bidder's security.

Exhibit B, Attachment 1
PUBLIC WORKS BID FORM

BID TIME	BID DATE
2 PM	June 9, 2009
PROJECT LOCATION	
HOLLISTER HILLS SVRA	
PROJECT NAME	
Office Expansion	

Nondiscrimination Compliance Statement: The prospective contractor's signature affixed hereon and dated shall constitute a certification under penalty of perjury under the laws of the State of California that the bidder has, unless exempted, complied with the nondiscrimination program requirements of Government Code Section 12990 and Title 2, California Code of Regulations, Section 8103.

Verification: By signing this Bid Form, the bidder assures the state that it has not been convicted of violating a state or federal law regarding the employment of undocumented aliens, in the preceding five years.

The prospective contractor's signature affixed hereon and dated shall constitute a certification that the representations made by the prospective contract in the bid are made under penalty of perjury under the laws of the State of California.

Important: Pursuant to Title 2, California Code of Regulations, Section 8103 and Business and Professions Code Section 7028.15, no bid will be considered unless it contains the certifications and license information requested on this form. The State reserves the right to waive any irregularity in any bid or to reject any or all bids.

CERTIFICATION

I, the official named below, CERTIFY UNDER PENALTY OF PERJURY that I am duly authorized to legally bind the prospective Contractor to the clause(s) listed above. This certification is made under the laws of the State of California. I understand that failure to submit the Public Works Bid Form without the appropriate bidder signature will result in rejection of the bid.

BY (Authorized Signature)	DATE
PRINTED NAME AND TITLE OF PERSON SIGNING	

CONTRACTOR/BIDDER FIRM NAME (Printed)	PHONE NO.	FAX NO.
ADDRESS	EMAIL ADDRESS:	
CITY/STATE/ZIP CODE		
LICENSE CLASSIFICATION	LICENSE NO.	LICENSE EXPIRATION DATE
STATUS OF BUSINESS (Check appropriate box.)		
☐ Individual.		
☐ Corporation. State in which incorporated: _____		
☐ Partnership. Full names of partners: _____		

Listed hereinafter are the names, addresses and contractor's license numbers of all subcontractors who will perform work or labor or render services in an amount in excess of one-half of one percent of the general contractor's total bi if this bid is accepted and the portion of the work that each will perform. Material vendors are not included.

KIND OF WORK	NAME AND ADDRESS	LICENSE NO.

The bidder hereby proposes to furnish all labor, materials, tools and equipment necessary to remodel the Ranger Resources Office building and expand and remodel the Administrative Office Building at **HOLLISTER HILLS SVRA**, San Benito County, California, complete and ready for use in accordance with the contract documents therefore, for the following lump sum which shall include all applicable taxes and other expenses:

Base Bid Lump Sum Total: \$ _____

Base Bid Lump Sum Total Written Out:

ADDENDUM ACKNOWLEDGEMENT (Please initial for Addendums received)

Addendum #1 _____ Addendum #3 _____

Addendum #2 _____ Addendum #4 _____

The bidder agrees to complete all work within **ONE HUNDRED EIGHTY (180)** calendar days from the date of written notice to commence work. This time includes ten (10) calendar days allowed for the contractor to begin work.

Participation in Disabled Veteran Enterprise Program: All DPR contracts over \$10,000 shall have a participation goal of not less than 6% for Disabled Veteran Business Enterprises. **ALL REFERENCES ON THE STD 840, DOCUMENTATION OF DVBE PROGRAM REQUIREMENTS, THAT REFER TO 3% PARTICIPATION ARE HEREBY AMENDED TO READ 6%.** In addition to other contracting requirements, to qualify as a responsive bidder, the bidder must either certify that the required goal has been achieved, or demonstrate that a good faith effort was made to meet the goal. Note: Ads must be published at least 14 days prior to the bid due date (refer to Page 3 of the DVBE requirements).

DVBE Incentive: For evaluation purposes only, an incentive will be given to bidders who meet the DVBE requirements, either through achieving the 6% DVBE participation or achieving less than the minimum 6% DVBE participation and completing a Good Faith Effort.

SMALL BUSINESS PREFERENCE: *To assist the Department in a timely evaluation of bids received, any bidder requesting the small business preference on this project is encouraged to submit along with signed STD. 811 - Small Business Preference and Certification Request, a copy of his/her small business certification approval letter from the State Office of Small Business and Disabled Veteran Business Enterprise Certification.*



DEPARTMENT OF PARKS AND RECREATION
Acquisition and Development
One Capitol Mall, Suite 500
Sacramento, California 95814

Ruth Coleman, Director

IMPORTANT NOTICE

DVBE FORM STD 840

ALL REFERENCES ON THE STD 840, *DOCUMENTATION OF DVBE PROGRAM REQUIREMENTS*, THAT REFER TO 3% PARTICIPATION ARE HEREBY AMENDED TO READ 6%.

BIDDERS MUST FULLY DOCUMENT AT LEAST ONE OF THE FOLLOWING OPTIONS TO COMPLY WITH DVBE REQUIREMENTS:

OPTION A – COMMITMENT TO FULL 6% DVBE GOAL

Bidder is a DVBE or uses identified DVBE(s) to meet full 6% participation goal.

OPTION B – GOOD FAITH EFFORT

Bidder must fully document all 4 contacts made with DVBE resources as well as publish advertisements. DVBE ads must be published at least 14 days prior to the bid due date.

OPTION C – Business Utilization Plan

Applies only to goods and information technology bids.

IF YOU HAVE QUESTIONS OR NEED HELP FILLING OUT
THE FORMS, CONTACT JAN VANDERBECK AT (916) 653-8674

California Disabled Veteran Business Enterprise Program Requirements

(REV. 9-15-03)

AUTHORITY. The Disabled Veteran Business Enterprise (DVBE) Participation Goal Program for state contracts is established in Public Contract Code (PCC), Section 10115 et seq., Military and Veterans Code, Section 999 et seq. and California Code of Regulations, Title 2 (2CCR), Section 1896.60 et seq.

The minimum DVBE participation percentage is 3% for this solicitation unless another percentage is specified in the solicitation.

INTRODUCTION. The bidder must document at least one of the options (A, B or C) in this document to comply with this solicitation's DVBE program requirements. Bids or proposals (hereafter called "bids") that fail to fully document one of the DVBE program requirements options shall be considered non-responsive and ineligible for award.

All information submitted by the intended awardee to comply with this solicitation's DVBE requirements will be verified by the State. If evidence of an alleged violation is found during the verification process, the State shall initiate an investigation with this information in accordance with the requirements of the Public Contract Code, Section 10115, et seq. and the Military and Veterans Code, Section 999 et seq. and follow the investigatory procedures required by the California Code of Regulations, Section 1896.80.

Only State of California, Office of Small Business and DVBE Certification certified DVBEs who perform a commercially useful function relevant to this solicitation may be used to satisfy the DVBE program requirements. The criteria for performing a commercially useful function are contained on page 5, Resources & Information and California Code of Regulations, Title 2, Section 1896.61(l). Verify each DVBE subcontractor's/supplier's certification with the Office of Small Business and DVBE Certification Section to ensure DVBE eligibility.

To meet the DVBE program requirements, bidders must complete and fully document at least one of the following compliance options:
Option A - Commitment to full DVBE participation - For a bidder who is a DVBE or who is able to meet the commitment to use identified DVBE(s) to fulfill the full DVBE participation goal.
Option B - Good Faith Effort - For a bidder documenting its completed effort, made prior to the bid due date, to obtain DVBE participation that may result in partial or no DVBE participation.
Option C - Business Utilization Plan - For a bidder using an annual plan (subject to approval) to satisfy DVBE participation requirements. Applies only to solicitations for goods and information technology.

PLEASE READ ALL INSTRUCTIONS CAREFULLY. These instructions contain information about the DVBE program requirements, bidder responsibilities, and requirements for performing and documenting each of the three available options as detailed below. Bidders are responsible for thorough review and compliance with these instructions. Document your option selection on the attached STD Form 840, Documentation of Disabled Veteran Business Enterprise Program Requirements.

OPTION A – COMMITMENT -- Commit to meet or exceed the DVBE participation requirement in this solicitation by either Method A1 or A2. Bidders must document DVBE participation commitment by completing and submitting the attached STD 840. Failure to complete and submit STD 840 (Side 1) as instructed shall render your bid non-responsive.

The bidder must provide, prior to contract award, a written agreement signed by the bidder and each proposed DVBE subcontractor. The written agreement will include the DVBE scope of work, work to be performed by the DVBE, term of intended subcontract with the DVBE, anticipated dates the DVBE will perform required work, rate and conditions of payment, total amount of contract to be paid to the DVBE, and the percentage of the entire contract that will be awarded to the DVBE, with each DVBE subcontractor. If this information is contained in the bidder's DVBE written agreement of intent, the agreement may be attached to the STD 840. If further verification is necessary, the state will obtain additional information to verify the above requirements.

Method A1. Certified DVBE bidder:

- a. Commit to performing at least 3% of the contract bid amount (unless otherwise specified) with your firm or in combination with other DVBE(s).
- b. Document DVBE participation on STD 840 (Side 1) and attach a copy of all applicable certifications.
- c. A DVBE bidder working in combination with other DVBEs shall be requested to submit proof of its commitment by submitting a written agreement with the DVBE(s) identified in its bid's STD 840. When requested, the written agreement must be submitted to the address or facsimile number specified and within the timeframe identified in the notification. Failure to submit the requested written agreement as specified may be grounds for bid rejection.

Method A2. Non-DVBE bidder:

- a. Commit to using certified DVBE(s) for at least 3% (unless otherwise specified) of the bid amount.
- b. When a bidder commits to less than the required 3% DVBE participation or its commitment may fall below 3% if specific line items/groups are not selected for award, then Option B, Good Faith Effort must be completed in addition to Option A, Commitment.
- c. Document DVBE participation on STD 840 (Side 1) and attach a copy of the DVBE's certification.
- d. Prior to contract award, a bidder is to submit proof of their commitment by submitting a written agreement with the DVBE(s) identified in its bid's STD 840. The awarding department contracting official named in this solicitation will contact each listed DVBE, by mail, fax or telephone, for verification of the bidder's submitted DVBE information. The written agreement must be submitted to the address or facsimile number specified and within the timeframe identified in the notification. Failure to submit the written agreement as specified may be grounds for bid rejection.

OPTION B – GOOD FAITH EFFORT (GFE) performance and documentation requirements must be completely satisfied prior to bid submission if you are unable to obtain and commit to the full DVBE participation percentage goal (Option A) and do not exercise Option C. Perform and document the following Steps 1 through 5 on both sides of the attached STD 840 form. Failure to perform and document GFE Steps 1 through 5 as instructed, which includes properly completing and submitting both sides of STD 840, shall result in your bid being deemed non-responsive. Step 3, Advertisement, is required unless specifically waived for this solicitation due to time limits imposed by the awarding department.

Step 1 Awarding Department - Contact the department's contracting official named in this solicitation to identify interested DVBEs. You must fully document this contact and describe the results on STD 840 (Side 2).

Step 2 Other State and Federal Agencies, and Local Organizations

STATE Contact the Department of General Services, Procurement Division's (DGS-PD) Office of Small Business and DVBE Certification (OSDC) to obtain a list of certified DVBEs by telephone at (916) 322-5060 for the 24-hour automated telephone system or (916) 375-4940 for the receptionist during normal business hours. This information can also be obtained by searching the online database at <http://www.pd.dgs.ca.gov/smbus>. Begin by selecting Certified Firm Inquiry Services, then search by using either the Keyword Search or the Standard Query options. You must fully document this contact and describe the results on STD 840 (Side 2).

FEDERAL Search the U.S. Small Business Administration's (SBA) online database (Pro-Net) at <http://www.pro-net.sba.gov> to identify potential DVBEs. Select these minimum options in the following sequence: select Search Database, select CA under "State"; select Service Disabled Veteran under "Other Ownership Data"; and "Search Using These Criteria" at the page bottom. The database takes a few moments to query, and then your list will appear on your screen. You may select other criteria to focus your search. You must fully document this contact and describe the results on STD 840 (Side 2).

LOCAL Contact at least one local DVBE organization to identify DVBEs. For a list of local DVBE organizations, please refer to the DVBE Resource Packet that may be accessed online (<http://www.pd.dgs.ca.gov/smbus> - select "DVBE Resource Packet") or obtain a hardcopy by requesting it from DGS-PD Office of Small Business and DVBE Outreach and Education (see the Resources & Information page). You must fully document your contact with local DVBE organizations and describe the results on STD 840 (Side 2).

Step 3 Advertisements are mandatory unless waived by the awarding department.

CONTENT REQUIREMENTS: Include all of the following in your advertisement(s): (1) company name; (2) contact name; (3) address; (4) telephone and facsimile (if applicable) numbers; (5) e-mail address (if applicable); (6) the state's solicitation number(s); (7) goods and/or services for which the state is soliciting; (8) the location of the work to be performed; and (9) the State's bid(s) due date and/or your due date for receiving DVBE responses.

HOW MANY & WHERE TO PUBLISH: Bidders must publish two (2) ads, one (1) each in a trade paper and a DVBE focus paper unless the paper is dual purpose (fulfilling both trade and focus requirements as defined in California Code of Regulations, Title 2, Section 1896.61(k)), in which case one (1) ad is acceptable. Please see <http://www.pd.dgs.ca.gov/smbus> for a list of DVBE Trade and Focus Paper Listings.

WHEN: Ads must be published after the solicitation's release date and at least 14 days prior to the bid due date, unless a different time period is expressly established in this solicitation.

DOCUMENT & SUBMIT: On STD 840 (Side 2), document the publication name(s) in which you published advertisement(s), the contact name and phone number, and date of publication. Include a copy(ies) of the advertisement(s) with your bid.

Step 4 Invitations to Participate

WHO: Invite (solicit) DVBEs who can provide relevant goods and/or services to this solicitation to subcontract with you. Conducting Steps 1 through 3 produces a list of DVBEs from which you may choose potential DVBEs subcontractors/suppliers to contact. Bidders are advised to contact as many DVBEs (who provide relevant goods and/or services in the applicable location(s)) as possible. Non-California-certified DVBEs are not eligible -- please refer those DVBEs to the OSDC to learn about certification (see the Resources & Information page for contact information).

FOR WHAT: Solicit DVBEs for goods and/or services relevant to the state's solicitation. If you are unable to identify specific portion(s) of the proposed contract to subcontract, the state encourages bidders to avoid making a predetermination that no DVBEs are able to perform without first contacting and soliciting participation from them. This allows DVBEs to respond whether they can or cannot provide any goods or services related to the solicitation, and provides a bidder with responses for consideration.

HOW TO INVITE & CONTENT REQUIREMENTS: Written invitations are required. At a minimum, invitations must contain all of the following: (1) company name; (2) contact name; (3) address; (4) phone and facsimile (if applicable) numbers; (5) return e-mail address (if applicable); (6) the state's solicitation number (NOT APPLICABLE FOR DPR); (7) goods and/or services for which the state is soliciting; (8) location of work; and (9) the State's bid(s) due date and/or your due date for receiving DVBE responses.

WHEN: Provide DVBE's with a reasonable time period to receive and respond to your invitation, and to be considered by you for participation as described in Step 5, prior to your bid submission.

DOCUMENT & SUBMIT: Bidders must document the completed contacts on STD 840 (Side 1), Section A. Attach additional copies of STD 840A as necessary to list your DVBE contacts. You are required to attach a copy of (1) each invitation or offer sent by letter, fax or e-mail; and (2) confirmation of transmission and delivery. Your bid shall be considered non-responsive if it fails to include copies of the written invitations and delivery confirmations.

Step 5 Consider all responding DVBEs for contract participation. Consideration must be based on business needs for the contract and the same evaluation criteria must be applied to each potential DVBE subcontractor/supplier offering the same goods and services. You must document on STD 840 (Side 1), Section A any firm(s) selected for participation; or if not selected, the reason for non-selection. Attach additional copies of STD 840A as necessary to list all of your DVBE contacts.

OPTION C – THE DVBE BUSINESS UTILIZATION PLAN (BUP) option permits bidders to submit an approved DVBE BUP to satisfy DVBE participation solicitation requirements up to 3%. **DVBE BUPs apply only to solicitations for goods and information technology (IT) goods and services.** DVBE BUPs are a company's commitment to expend a minimum of 3% of its total statewide contract dollars with DVBEs -- this percentage is based on all of its contracts in the State, not just those with the State. DVBE BUPs must be submitted to and approved by the DGS-PD prior to the bid due date. Please call the DGS-PD, Office of Small Business and DVBE Outreach and Education for assistance. Bidders choosing this option must properly complete and submit STD 840 (Side 1) and include a copy of its approval letter with the bid; failure to submit these documents shall render your bid non-responsive.

RESOURCES AND INFORMATION

For assistance in preparing a responsive participation document, **contact the contracting official at the awarding department for this solicitation.** In accordance with Public Contract Code Section 10115.2(b)(3), bidders must advertise in trade and focus publications unless the requirement is waived. The Department of General Services, Procurement Division (DGS-PD) publishes a list of trade and focus publications to assist bidders in meeting these contract requirements. To obtain this list, please contact the DGS-PD Office of Small Business and DVBE Outreach and Education and request the "DVBE Resource Packet."

U.S. Small Business Administration (SBA)

Internet contact only – see instructions for website navigation
PRONET Database: <http://www.pro-net.sba.gov>

FOR:

Service-Disabled Veteran-owned businesses in California

(Remember to verify each DVBE's California certification.)

Local Organizations (see the DVBE Resource Packet available from DGS-PD DVBE Program Section listed below)

FOR:

List of potential DVBE subcontractors

DGS-PD Office of Small Business and DVBE Certification (OSDC)

707 Third Street, Room 400, West Sacramento, CA 95605
Website: <http://www.pd.dgs.ca.gov/smbus>
24-hour automated information
& document requests: (916) 322-5060
Receptionist: (916) 375-4940
Fax: (916) 375-4950

FOR:

**Directory of Certified DVBEs
Certification Applications
Certification Information
Certification Status, Concerns**

DGS-PD Office of Small Business and DVBE Outreach and Education

707 Third Street, 2nd Floor, West Sacramento, CA 95605
Voice, 8 am—5 pm: (800) 559-5529
Fax: (916) 375-4597

FOR:

**DVBE Program Participation Requirements
DVBE Program Info. and Statewide Policy
DVBE Resource Packet
DVBE Business Utilization Plan
Small Business/DVBE Advocates**

Advertisement Format Example

This example offers a suggested format that includes required information outlined in Option B, Good Faith Effort, Step 3. You can substitute the applicable information for the bolded, italicized words.

DVBEs are invited to participate as a potential subcontractor/supplier to perform a commercially useful function specific to **DGS' IFB No. 12345** for ***fencing materials in Chowchilla.***
DVBE responses due to me 1/1/02;
Bids due to the State 1/15/02.

Contact: **ABC Company**
Jane Doe, General Manager
123 Main Street, Sacramento, CA 95814
voice: **555/555-5555**; fax: **555/555-5556**
or e-mail: ***jane.doe@abcco.com***

Commercially Useful Function Definition

California Code of Regulations, Title 2, § 1896.61(l):

The term "DVBE contractor, subcontractor or supplier" means any person or entity that satisfies the ownership (or management) and control requirements of Section 1896.61(f); is certified in accordance with Section 1896.70; and provides services or goods that contribute to the fulfillment of the contract requirements by performing a commercially useful function. A DVBE contractor, subcontractor or supplier is considered performing a commercially useful function when it meets the following criteria:

(1) The business concern is: responsible for the execution of a distinct element of the work of the contract; carrying out its obligation by actually performing, managing or supervising the work involved; and performing work that is normal for its business services and functions, and

(2) The business concern is not further subcontracting a greater portion of the work than would be expected by normal industry practices.

DOCUMENTATION OF DISABLED VETERAN BUSINESS ENTERPRISE PROGRAM REQUIREMENTS

STD 840 (REV. 9-15-2003)

Designation Of Option Check the appropriate box(es) to indicate the option(s) with which you choose to comply, complete the applicable sections and attach the required supporting documentation. You are advised to read all instructions carefully prior to completing this form. Remember that only California certified DVBEs who can provide related goods and/or services may be used to satisfy these program solicitation requirements.

- ☐ **OPTION A – I commit to meeting the full DVBE contract participation requirement.**
Complete STD 840, Section A.
- ☐ **OPTION B – I performed and documented a Good Faith Effort (GFE) in an attempt to obtain DVBE participation.**
Complete STD 840, Section A (for GFE Steps 4 & 5) and STD 840 (REVERSE), Section B (for GFE Steps 1–3).
- ☐ **OPTION C – I submit a copy of my firm's "Notice of Approved DVBE Business Utilization Plan."**

A. Full information must be provided.

For contract participation commitment, at least one DVBE must be listed. DVBEs must perform a commercially useful function. List the specific goods and/or services with the dollar and/or percentage value(s) that the DVBE(s) commit(s) to provide and the DVBE's tier (prime contractor = 0, subcontractor to prime contractor = 1, subcontractor to Tier 1 subcontractor = 2, etc.). If both the estimated dollar amount and percentage are listed, the higher value supercedes. Attach additional pages to list all other DVBE subcontractors/suppliers (you may use STD 840A). During contract performance, all requests for substituting named DVBEs must be made in accordance with the provisions of California Code of Regulations, Title 2, Section 1896.64(c).

For Good Faith Effort (GFE), use this section to document your first completed contacts with (Step 4), and consideration of (Step 5), relevant DVBEs. Business reasons for non-selection must be documented. Attach additional pages to list all other DVBE contacts (you may use STD 840A). Copies of all written invitations and delivery confirmations must also be attached and submitted with the bid.

BOTH SECTIONS MUST BE COMPLETED FOR GOOD FAITH EFFORT AT LEAST ONE DVBE MUST BE NAMED FOR PARTICIPATION	Date Contacted / /		DVBE Company Name (If you are the Prime and a DVBE enter your name, otherwise enter the solicited subcontractor.)			
	DVBE Contact Name & Reference #		Telephone Number ()	Fax Number ()	E-mail (if available)	
	Street Address, City, State and Zip Code					
	OR	☐ Yes, I am, or I will subcontract with, the listed DVBE to provide the following goods and/or services:				
		Specific Goods and/or Services			Estimated \$ and/or % \$ / %	Tier
		☐ No, I am unable to subcontract with the DVBE for the following business reasons:				
	Date Contacted / /		DVBE Company Name			
	DVBE Contact Name		Telephone Number ()	Fax Number ()	E-mail (if available)	
	Street Address, City, State and Zip Code					
	OR	☐ Yes, I will subcontract with the listed DVBE to provide the following goods and/or services:				
Specific Goods and/or Services			Estimated \$ and/or % \$ / %	Tier		
☐ No, I am unable to subcontract with the DVBE for the following business reasons:						

ATTACH ADDITIONAL PAGES (OR USE STD 840A) TO LIST ALL OTHER DVBE CONTACTS

Go to Side 2, Section B to continue Good Faith Effort documentation ⇨

ADDITIONAL DISABLED VETERAN BUSINESS ENTERPRISE CONTACTS

STD 840A (EST. 9-15-2003)

- B. Documentation of Good Faith Effort Steps 1, 2 and 3**—Remember to carefully read all instructions prior to completing this form. Please refer to the Resources & Information page for detailed contact information and a sample advertisement format.

STEP 1. Contact the Awarding Department (the contracting official, unless another contact is specified) to identify potential DVBE subcontractors/suppliers, **and document this contact as required.**

Date / /	Contact Name: <i>ATTENTION BIDDERS: CONTACT JAN VANDERBECK</i>	Telephone Number (916) 653-8674
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Describe Result

STEP 2. Contact all of the following and document your contacts as required: Other state and federal agencies and local organizations to identify potential DVBE subcontractors/suppliers.

Other State Agency – Procurement Division, Office of Small Business and DVBE Certification (Certification Office)

PHONE CONTACT OR ONLINE SEARCH	Date / /	Telephone Number (916) 322-5060 (916) 375-4940	Contact Name	☐ <i>I contacted the Certification Office for a list of California certified DVBEs.</i>
	Date / /	Internet Address http://www.pd.dgs.ca.gov/smbus		☐ <i>I searched the Certification Office's online database to identify California certified DVBEs.</i>

Describe Result

Federal Agency – U.S. Small Business Administration (SBA) online database

Date / /	Internet Address http://www.pro-net.sba.gov	<i>I searched the federal online database for DVBEs.</i>
-------------	---	--

Describe Result

**SAMPLE
FORM**

Local DVBE Organizations – Contact at *(http://www.pd.dgs.ca.gov/smbus)* refer to the DVBE Resource Packet for a list of acceptable contacts. (select “DVBE Resource Packet”)

Date / /	Organization Name	Contact Name	Telephone Number and/or Internet Address () http://www.
-------------	-------------------	--------------	---

Describe Result

Date / /	Organization Name	Contact Name	Telephone Number and/or Internet Address () http://www.
-------------	-------------------	--------------	---

Describe Result

STEP 3. Publish advertisements: Two (2) advertisements: One (1) ad in an accepted trade paper; and one (1) ad in an accepted DVBE focus paper (please see the DVBE Trade and Focus Paper Listings for a list of all accepted publications); unless the paper is dual purpose (fulfilling both trade and focus requirements), in which case one (1) ad is acceptable. **Document this step as required and remember to attach a copy of your advertisement(s).**

Focus Paper Name (list full name) Advertising Requirement Waived	Contact Name	Telephone Number ()
Address		Date Ad Published / /
Trade Paper Name (list full name) Advertising Requirement Waived	Contact Name	Telephone Number ()
Address		Date Ad Published / /

☐ *I certify the ad was placed to reach both trade and focus audiences through this one publication.*

Trade and Focus Paper Name (list full name)	Contact Name	Telephone Number ()
Address		Date Ad Published / /

ADDITIONAL DISABLED VETERAN BUSINESS ENTERPRISE CONTACTS

STD 840A (EST. 9-15-2003)

This document may be used as a continuation from Section A, STD 840 (REV. 9-15-2003)

Date Contacted / /	DVBE Company Name		
-----------------------	-------------------	--	--

DVBE Contact Name	Telephone Number ()	Fax Number ()	E-mail (if available)
-------------------	-------------------------	-------------------	-----------------------

Street Address, City, State and Zip Code

OR	☐ Yes, I will subcontract with the listed DVBE to provide the following goods and/or services:		
	Specific Goods and/or Services	Estimated \$ and/or % \$ / %	Tier
	☐ No, I am unable to subcontract with the DVBE for the following business reasons:		

Date Contacted / /	DVBE Company Name		
-----------------------	-------------------	--	--

DVBE Contact Name	Telephone Number ()	Fax Number ()	E-mail (if available)
-------------------	-------------------------	-------------------	-----------------------

Street Address, City, State and Zip Code

OR	☐ Yes, I will subcontract with the listed DVBE to provide the following goods and/or services:		
	Specific Goods and/or Services	Estimated \$ and/or % \$ / %	Tier
	☐ No, I am unable to subcontract with the DVBE for the following business reasons:		

Date Contacted / /	DVBE Company Name		
-----------------------	-------------------	--	--

DVBE Contact Name	Telephone Number ()	Fax Number ()	E-mail (if available)
-------------------	-------------------------	-------------------	-----------------------

Street Address, City, State and Zip Code

OR	☐ Yes, I will subcontract with the listed DVBE to provide the following goods and/or services:		
	Specific Goods and/or Services	Estimated \$ and/or % \$ / %	Tier
	☐ No, I am unable to subcontract with the DVBE for the following business reasons:		

Date Contacted / /	DVBE Company Name		
-----------------------	-------------------	--	--

DVBE Contact Name	Telephone Number ()	Fax Number ()	E-mail (if available)
-------------------	-------------------------	-------------------	-----------------------

Street Address, City, State and Zip Code

OR	☐ Yes, I will subcontract with the listed DVBE to provide the following goods and/or services:		
	Specific Goods and/or Services	Estimated \$ and/or % \$ / %	Tier
	☐ No, I am unable to subcontract with the DVBE for the following business reasons:		

ADDITIONAL DISABLED VETERAN BUSINESS ENTERPRISE CONTACTS

STD 840A (EST. 9-15-2003) (REVERSE)

Date Contacted / /	DVBE Company Name		
DVBE Contact Name	Telephone Number ()	Fax Number ()	E-mail (if available)
Street Address, City, State and Zip Code			

OR	☐ Yes, I will subcontract with the listed DVBE to provide the following goods and/or services:		
	Specific Goods and/or Services	Estimated \$ and/or % \$ / %	Tier
	☐ No, I am unable to subcontract with the DVBE for the following business reasons:		

Date Contacted / /	DVBE Company Name		
DVBE Contact Name	Telephone Number ()	Fax Number ()	E-mail (if available)
Street Address, City, State and Zip Code			

OR	☐ Yes, I will subcontract with the listed DVBE to provide the following goods and/or services:		
	Specific Goods and/or Services	Estimated \$ and/or % \$ / %	Tier
	☐ No, I am unable to subcontract with the DVBE for the following business reasons:		

Date Contacted / /	DVBE Company Name		
DVBE Contact Name	Telephone Number ()	Fax Number ()	E-mail (if available)
Street Address, City, State and Zip Code			

OR	☐ Yes, I will subcontract with the listed DVBE to provide the following goods and/or services:		
	Specific Goods and/or Services	Estimated \$ and/or % \$ / %	Tier
	☐ No, I am unable to subcontract with the DVBE for the following business reasons:		

Date Contacted / /	DVBE Company Name		
DVBE Contact Name	Telephone Number ()	Fax Number ()	E-mail (if available)
Street Address, City, State and Zip Code			

OR	☐ Yes, I will subcontract with the listed DVBE to provide the following goods and/or services:		
	Specific Goods and/or Services	Estimated \$ and/or % \$ / %	Tier
	☐ No, I am unable to subcontract with the DVBE for the following business reasons:		

DVBE Program Requirements Supplier Checklist (REV. 9-15-2003)

Please do not submit this checklist with your bid. It is provided for your use only. Checking every box of your elected compliance option does not guarantee that your bid will be evaluated compliant.

☐ **OPTION A: COMMITMENT TO DVBE CONTRACT PARTICIPATION**

- ☐ STD 840 included with bid
- ☐ DVBE Written Agreement
- ☐ Designated the Commitment Option – Checked the first box
- ☐ Listed at least one California certified DVBE subcontractor
- ☐ Checked the box(es) for “Yes ...”
- ☐ Listed specific goods and/or services DVBE(s) agrees to provide
- ☐ Proposed DVBE contract performance is a “commercially useful function” relevant to the contract
- ☐ Listed the estimated dollar amount and/or percentage of contract for the DVBE’s participation
- ☐ Proposed DVBE participation meets the 3% requirement (unless a different percentage is specified)
- ☐ Attached a copy of the DVBE’s certification letter from the Department of General Services

☐ **OPTION B: GOOD FAITH EFFORT (GFE)**

- ☐ STD 840 included with bid
- ☐ Designated the GFE Option – Checked the second box
- ☐ (Step 4) Listed all DVBEs contacted and invited to perform on the proposed contract
- ☐ Confirmed that listed DVBEs are California certified
- ☐ Attached copies of the invitations sent to the listed DVBEs
- ☐ Invitations included the required contact information
- ☐ Attached copies of the delivery confirmations for invitations to DVBEs (e.g. mail receipts, fax confirmations, etc.)
- ☐ (Step 5) Checked the “No” boxes and listed the business reasons for non-selection of DVBEs contacted
- ☐ (Step 1) Contacted the Awarding Department and listed contact and results
- ☐ (Step 2) Contacted Other State agency (Office of Small Business and DVBE Certification) and listed the contact and results
- ☐ (Step 2) Searched the Federal Pro-net internet database and noted the results
- ☐ (Step 2) Contacted Local DVBE Organization(s) and listed the contact and results
- ☐ (Step 3) Advertised – IF NOT WAIVED
 - Listed full information for the advertisement(s) and publication(s)
[2 ads in one trade and in one DVBE focus publication; **OR** 1 ad in one dual-purpose publication]
- ☐ Attached a copy of the advertisement(s)
- ☐ The advertisement(s) were published at least 14 days prior to the bid due date
- ☐ The advertisement(s) included my required contact information

☐ **OPTION C: BUSINESS UTILIZATION PLAN (BUP)**

- ☐ **Prior to the bid due date** -- Submitted a BUP to DGS-PD and received approval
- ☐ STD 840 included with bid
- ☐ Designated the BUP Option – Checked the third box
- ☐ Attached a copy of the BUP Approval letter from DGS-PD

DISABLED VETERAN BUSINESS ENTERPRISE DECLARATIONS

STD. 843 (Rev. 11/2005)

Instructions: The disabled veteran (DV) owner(s) and DV manager(s) of the Disabled Veteran Business Enterprise (DVBE) must complete this declaration when a DVBE contractor or subcontractor will provide materials, supplies, services or equipment [Military and Veterans Code Section 999.2]. Violations are misdemeanors and punishable by imprisonment or fine and violators are liable for civil penalties. All signatures are made under penalty of perjury.

SECTION 1

Name of certified DVBE: _____ DVBE Ref. Number: _____

PO/Contract Description (materials/supplies/services/equipment): _____

Solicitation/Contract Number: _____ SCPRS Ref. Number: _____

(FOR STATE USE ONLY)

SECTION 2**APPLIES TO ALL DVBEs. Check only one box in Section 2 and provide original signatures.**

- ☐ I (we) declare that the DVBE is not a broker or agent, As defined in Military and Veterans Code Section 999.2 (b), of materials, supplies, services or equipment listed above. Also, complete Section 3 below if renting equipment.
- ☐ Pursuant to Military and Veterans Code Section 999.2 (f), I (we) declare that the DVBE is a broker or agent for the principal(s) listed below or on an attached sheet(s). *(Pursuant to Military and Veterans Code 999.2 (e), State funds expended for equipment rented from equipment brokers pursuant to contracts awarded under this section shall not be credited toward the 3-percent DVBE participation goal.)*

All DV owners and managers of the DVBE (attach additional pages with sufficient signature blocks for each person to sign):

(Printed Name of DV Owner/Manager)

(Signature of DV Owner/Manager)

(Date Signed)

(Printed Name of DV Owner/Manager)

(Signature of DV Owner/Manager)

(Date Signed)

Firm/Principal for whom the DVBE is acting as a broker or agent: _____

(If more than one firm, list on extra sheets.)

(Print or Type Name)

Firm/Principal Phone: _____ Address: _____

SECTION 3**APPLIES TO ALL DVBEs THAT RENT EQUIPMENT AND DECLARE THE DVBE IS NOT A BROKER.**

- ☐ Pursuant to Military and Veterans Code Section 999.2 (c), (d) and (g), I am (we are) the DV(s) with at least 51% ownership of the DVBE, or a DV manager(s) of the DVBE. The DVBE maintains certification requirements in accordance with Military and Veterans Code Section 999 et. seq.
- ☐ The undersigned owner(s) own(s) at least 51% of the quantity and value of each piece of equipment that will be rented for use in the contract identified above. I (we), the DV owners of the equipment, have submitted to the administering agency my (our) personal federal tax return(s) at time of certification and annually thereafter as defined in *Military and Veterans Code 999.2*, subsections (c) and (g). *Failure by the disabled veteran equipment owner(s) to submit their personal federal tax return(s) to the administering agency as defined in Military and Veterans Code 999.2, subsections (c) and (g), will result in the DVBE being deemed an equipment broker.*

Disabled Veteran Owner(s) of the DVBE (attach additional pages with signature blocks for each person to sign):

(Printed Name)

(Signature)

(Date Signed)

(Address of Owner)

(Telephone Number of Owner)

(Tax Identification Number of Owner)

Disabled Veteran Manager(s) of the DVBE (attach additional pages with sufficient signature blocks for each person to sign):

(Printed Name of DV Manager)

(Signature of DV Manager)

(Date Signed)

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

**NONCOLLUSION AFFIDAVIT TO BE EXECUTED BY
BIDDER AND SUBMITTED WITH BID FOR PUBLIC WORKS**

STATE OF CALIFORNIA)
) ss
COUNTY OF _____)

(Name)

(Position title)

(The bidder)

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 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.

DATED: _____

By _____
(Person signing for bidder)

Subscribed and sworn to

before me on _____

(Notarial Seal)

(Notary Public)

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

BIDDER'S BOND

KNOW ALL PEOPLE BY THESE PRESENTS:

That we, _____

_____, as Principal, and as Surety,
are held and firmly bound unto the State of California, hereinafter called the State, in the penal sum of ten percent (10%) of the
total amount of the bid of the Principal above named, submitted by said Principal to the State of California, Department of Parks
and Recreation for the work described below, for the payment of which sum in lawful money of the United States, 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:

WHEREAS, the Principal has submitted the above-mentioned bid to the State of California, Department of Parks and Recreation,
for certain construction specifically described as follows, for which bids are to be opened at

(Insert place where bids will be opened)

_____, on _____
(Insert date of bid opening)

for _____
(Copy here the exact description of work, including location, as it appears on the proposal)

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

In the event suit is brought upon this bond by the Obligee and judgment is recovered, the Surety shall pay all costs incurred by
the Obligee in such suit, including a reasonable attorney's fee to be fixed by the court.

IN WITNESS WHEREOF, We have hereunto set our hands and seals on this _____ day of _____, 20 ____.

(SEAL)

(SEAL)

(SEAL)

Principal

(SEAL)

(SEAL)

(SEAL)

Surety

NOTE: Signatures of those executing for the Surety must be properly acknowledged.

CERTIFICATE OF ACKNOWLEDGEMENT

State of California

County of _____ ss

On this _____ day of _____ in the year of 20 _____ before me, a notary public in and for the county and state
aforesaid, personally appeared, _____
known to me to be the person whose name is subscribed to the within instrument and known to me to be the attorney-in-fact of
_____ and acknowledged to me that
he subscribed the name of the said company thereto as surety, and his own name as attorney-in-fact.

(SEAL)

Notary Public

SMALL BUSINESS PREFERENCE AND CERTIFICATION REQUEST
(For Construction Contractors Only)

STD. 811 (REV 6-2001)(CA ST PKS, EXCEL 2/25/2009)

READ BEFORE SIGNING
(THIS REQUEST MUST REMAIN WITH THE BID PACKAGE)• **1. PENALTY ASSESSMENT**

A business will be assessed a penalty and be ineligible to transact any business with the Department for furnishing incorrect information. (Title 2 of the California Code of Regulations)

• **2. ~~PUBLIC WORKS AGREEMENTS EXCEEDING \$100,000 AND REQUIRING TYPES "A" OR "B" CONTRACTORS LICENSE~~**

~~On public works agreements where the lowest responsible bid exceeds \$100,000, and the work to be performed requires a type "A" or "B" contractor's license and two or more subcontractors will be used, preferences shall only be granted to those small business bidders who certify, under penalty of perjury, that at least fifty percent (50%) of subcontractors utilized on the job are certified small businesses. In meeting the 50% requirement, bidders may use certified small business and/or small businesses that have applied for certification no later than 5:00 P.M. on the bid opening date and are subsequently granted certification. The 50% small business subcontractor utilization level shall be maintained through the term of the contract.~~

• **3. JOINT BIDDERS/COMBINATION BIDDERS**

Bidders bidding jointly or as a combination of several business organizations are especially cautioned that such bidders must be jointly licensed and approved in the form and style in which the bid is executed

• **4. NAME STYLE**

The Small Business Preference and Certification Request must be signed in the same name style in which the bidder is licensed by the Contractors' State License Board.

BIDDER'S(S) LEGAL NAME STYLE

FEDERAL EMPLOYER IDENTIFICATION NUMBER

OSBCR CERTIFICATION NUMBER

CERTIFICATION

- **5.** The undersigned hereby requests preference as a "SMALL BUSINESS" and further certifies under penalty of perjury, that the firm still meets the requirements of Section 1896(L) Title 2 of the California Code of Regulations. A completed form STD. 813 meeting all applicable requirements must be on file in the Office of Small Business Certification and Resources (OSBCR) by 5:00 p.m. of the bid opening date. The form STD. 813 may be obtained from the OSBCR Office at 1531 I Street, Second Floor, Sacramento, CA or can be downloaded at www.dgs.ca.gov/osbcr.

BIDDER'S SIGNATURE

DATE SIGNED

• **6. BIDDERS RECEIVING BONDING ASSISTANCE**

In the event the bidder has received assistance in obtaining bonding for this project, he/she shall set forth the name and nature of the firm providing such assistance. Should the firm be listed as a subcontractor, bidder shall set forth the percentage of the contract to be performed by the subcontractor.

NAME OF FIRM PROVIDING BONDING ASSISTANCE

NATURE OF FIRM PROVIDING BONDING ASSISTANCE

SUBCONTRACTOR ASSISTANCE

☐ YES - Percentage _____☐ NO

CALIFORNIA PUBLIC CONTRACT CODE SECTION 10162
— Questionnaire —

PARK UNIT NAME	PROJECT NAME
NAME OF BUSINESS	

In accordance with Section 10162 of the California Public Contract Code, bidders shall complete, under penalty of perjury, the question below. Please answer the following:

HAVE YOU, ANY OFFICER OF YOUR BUSINESS, OR ANY EMPLOYEE OF YOUR BUSINESS WHO HAS PROPRIETARY INTEREST IN YOUR BUSINESS EVER BEEN DISQUALIFIED, REMOVED, OR OTHERWISE PREVENTED FROM BIDDING ON, OR COMPLETING A FEDERAL, STATE, OR LOCAL GOVERNMENT PROJECT BECAUSE OF A VIOLATION OF LAW OR VIOLATION OF SAFETY REGULATIONS? ☐ **Yes** (Explain circumstances below. Attach additional pages if needed.) ☐ **No**

SAMPLE

NOTICE TO BIDDERS

Bidders are cautioned that making false certification may subject the certifier to criminal prosecution.

The Department of Parks and Recreation (DPR) reserves the right under California Public Contract Code Section 10162 to reject any bidder, any officer of such bidder, or any employee of such bidder who has a proprietary interest in such bidder who has been disqualified, removed or otherwise prevented from bidding on, or completing a federal, state or local government project because of a violation of law or violation of safety regulations.

Failure to return this form with the bid shall not be cause for rejection; however, bidders must furnish the completed form within the time frame prescribed by the DPR. Failure to submit this form within the time frame prescribed by the DPR may be deemed refusal of an award which shall be cause for forfeiture of bidder's security.

CERTIFICATION

By my signature, I certify under penalty of perjury under the laws of the State of California that the foregoing questionnaire and statements pursuant to California Public Contract Code Section 10162 are true and correct

BIDDER SIGNATURE

PRINTED NAME

DATE



DARFUR CONTRACTING ACT

Pursuant to Public Contract Code section 10478, if a bidder or proposer currently or within the previous three years has had business activities or other operations outside of the United States, it must certify that it is not a "scrutinized" company as defined in Public Contract Code section 10476.

Therefore, to be eligible to submit a bid or proposal, please complete only one of the following three paragraphs (via initials for Paragraph # 1 or Paragraph # 2, or via initials and certification for Paragraph # 3):

1. _____ We do not currently have, or we have not had within the previous
Initials three years, business activities or other operations outside of the
United States.

OR

2. _____ We are a scrutinized company as defined in Public Contract Code
Initials section 10476, but we have received written permission from the
Department of General Services (DGS) to submit a bid or proposal
pursuant to Public Contract Code section 10477(b). A copy of the
written permission from DGS is included with our bid or proposal.

OR

3. _____ We currently have, or we have had within the previous three
Initials year's business activities or other operations outside of the United
States, but we certify below that we are not a scrutinized
+ certification company below as defined in Public Contract Code section 10476.

CERTIFICATION For # 3.

I, the official named below, CERTIFY UNDER PENALTY OF PERJURY that I am duly authorized to legally bind the prospective proposer/bidder to the clause listed above in # 3. This certification is made under the laws of the State of California.

Proposer/Bidder Firm Name (Printed)		Federal ID Number
By (Authorized Signature)		
Printed Name and Title of Person Signing		
Date Executed	Executed in the County and State of	

YOUR BID OR PROPOSAL WILL BE DISQUALIFIED UNLESS YOUR BID OR PROPOSAL INCLUDES THIS FORM WITH EITHER PARAGRAPH # 1 OR # 2 INITIALED OR PARAGRAPH # 3 INITIALED AND CERTIFIED.

STANDARD AGREEMENT

STD 213[PW] (Rev 06/03)(CA ST PKS, EXCEL 10/20/2004)

AGREEMENT NUMBER

REGISTRATION NUMBER

1. This Agreement is entered into between the State Agency and Contractor named below:

STATE AGENCY'S NAME

CONTRACTOR'S NAME

2. The term of this Agreement is: through

3. The maximum amount \$ of this Agreement is:

4. The parties agree to comply with the terms and conditions of the following exhibits which are by this reference made a part of the Agreement.

Exhibit A - Scope of Work page(s)

Exhibit B - Budget Detail and Payment Provisions page(s)

Exhibit C* - General Terms and Conditions page(s)

Check mark one item below as Exhibit D:

☐
☐Exhibit - D Special Terms and Conditions (Attached hereto as part of this agreement)
Exhibit - D* Special Terms and Conditions

page(s)

Exhibit D, Attachment 1 - Project Manual

pages

Exhibit E - Additional Provisions

pages

Items shown with an Asterisk (*), are hereby incorporated by reference and made part of this agreement as if attached hereto.
These documents can be viewed at www.ols.dgs.ca.gov/Standard+Language

IN WITNESS WHEREOF, this Agreement has been executed by the parties hereto.**CONTRACTOR**

CONTRACTOR'S NAME (if other than an individual, state whether a corporation, partnership, etc.)

BY (Authorized Signature)

DATE SIGNED(Do not type)



PRINTED NAME AND TITLE OF PERSON SIGNING

ADDRESS

STATE OF CALIFORNIA

AGENCY NAME

BY (Authorized Signature)

DATE SIGNED(Do not type)



PRINTED NAME AND TITLE OF PERSON SIGNING

ADDRESS

**California Department of General
Services Use Only**☐ Exempt per:

Contractor's Name:
Agreement Number:
Page: _____ of _____

**EXHIBIT A — Public Works
(Standard Agreement)**

SCOPE OF WORK

1. Contractor agrees to furnish all labor, tools, materials and equipment necessary to:

2. The work shall be performed at:

3. The work shall be provided during:

4. The project representatives during the term of this agreement will be:

State Agency:		Contractor:	
Section/Unit:		Section/Unit:	
Attention:		Attention:	
Address:		Address:	
City/State/Zip Code:		City/State/Zip Code:	
Phone:		Phone:	
Fax:		Fax:	

**EXHIBIT B — PUBLIC WORKS
(Standard Agreement)**

BUDGET DETAIL AND PAYMENT PROVISIONS

1. Invoicing and Payment

- A. For services satisfactorily rendered, and upon receipt and approval of the invoices, the State agrees to compensate the Contractor for actual expenditures incurred in accordance with the rates specified in the Bid Form, marked Exhibit B, Attachment 1, which is attached hereto and made a part of this Agreement.
- B. Invoices shall include the Agreement Number and shall be submitted in triplicate not more frequently than monthly in arrears to:

State's Representative's Name
State's Rep Service Center
Service Center Address
Service Center City/State/Zip

2. Budget Contingency Clause

- A. It is mutually agreed that if the Budget Act of the current year and/or any subsequent years covered under this Agreement does not appropriate sufficient funds for the program, this Agreement shall be of no further force and effect. In this event, the State shall have no liability to pay any funds whatsoever to Contractor or to furnish any other considerations under this Agreement and Contractor shall not be obligated to perform any provisions of this Agreement.
- B. If funding for any fiscal year is reduced or deleted by the Budget Act for purposes of this program, the State shall have the option to either cancel this Agreement with no liability occurring to the State, or offer an agreement amendment to Contractor to reflect the reduced amount.

3. Prompt Payment Clause

Payment will be made in accordance with, and within the time specified in, Government Code Chapter 4.5, commencing with Section 927.

4. Compensation

Contractor shall submit to the State an itemized request for payment, in triplicate, no more than once each 30 day period. All invoices or requests for payment, not on Contractor's preprinted stationery, shall be signed by the Contractor or his authorized representative and submitted to the State's Representative as indicated in paragraph 1B above.

Ten percent (10%) shall be retained from each progress payment and held by the State as partial security for the fulfillment of the contract by the Contractor. The State shall pay the Contractor the value of such work, as estimated therein, after deducting therefrom all previous payments, and all amounts to be retained under the provisions of this Agreement. No progress payments will be made by the State for project terms less than thirty (30) days. The one and only payment will be the final payment made by the State upon satisfactory completion of all work required under the contract documents.

Contractor's Name:

Agreement Number:

Page: 1 of 1

**EXHIBIT D — PUBLIC WORKS
(Standard Agreement)**

SPECIAL TERMS AND CONDITIONS

1. Project Manual

The Project Manual, marked Exhibit D, Attachment I, containing instructions to bidders, general conditions, plans and specifications, and other pertinent bid documents related to this project, as enumerated in the Project Manual's Table of Contents, is hereby attached and incorporated into this agreement.

2. Public Works - Rules/Regulations

Contractor shall observe and comply with all federal, state, city, and county laws, rules or regulations affecting the work. Any work done that does not comply with any laws, rules, or regulations will be remedied at the Contractor's expense.

SAMPLE

PAYMENT BOND TO ACCOMPANY CONSTRUCTION CONTRACT
(CIVIL CODE SECTION 3247)

BOND NO. _____

The premium on this bond is _____ for the term _____

Know All Men By These Presents:

That The State of California, acting by and through the _____

has awarded to _____ whose address is _____

(CONTRACTOR / PRINCIPLE)

_____ as Principle, a contract for the work described as follows:

WHEREAS, The provisions of Civil Code Section 3247 require that the Principle file a bond in connection with said contract and this bond is executed and tendered in accordance therewith.

NOW THEREFORE, Principle and _____, a corporation organized
under the laws of _____ (SURETY)

, and authorized to transact a general surety business in the State California, as Surety, are held and firmly bound to the People of the State of California in the penal sum of _____

(_____), for which payment

we bind ourselves, our heirs, executors, administrators, successors and assigns jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH,

1. That if said Principle or its subcontractors shall fail to pay any of the persons named in Civil Code Section 3181, or amounts due under the Unemployment Insurance Code with respect to work or labor performed under the contract, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Principle and subcontractors pursuant to Section 13020 of the Unemployment Insurance Code, with respect to such work and labor, that the Surety herein will pay for the same, otherwise this obligation is to be void. In case suit brought upon this bond, the Surety will pay a reasonable attorney's fee to be fixed by the court.

2. This bond shall insure to the benefit of any persons named in Civil Code Section 3181 as to give a right of action to such persons or their assigns in any suit brought upon this bond.

3. The aggregate liability of the Surety hereunder, including costs and attorney fees, on all claims whatsoever shall not exceed the penal sum of the bond in accordance with the provisions of Section 996.470(a) of the Code of Civil Procedure.

4. The bond is executed by the Surety, to comply with the provisions of Chapter 7, Title 15, Part 4, Division 3 of the Civil Code and of Chapter 2, Title 14, Part 2 of the Code of Civil Procedure and said bond shall be subject to all of the terms and provisions thereof.

5. This bond may be cancelled by the Surety in accordance with the provisions of Section 996.310 et seq. of the Code of Civil Procedure.

6. This bond to become effective _____

(NAME OF SURETY)

(ADDRESS)

I certify (or declare) under penalty of perjury that I have executed the foregoing bond under an unrevoked power of attorney.

Executed in _____ on _____
(CITY AND STATE) (DATE)

under the laws of the State of California.

(SIGNATURE OF ATTORNEY IN FACT)

(PRINTED OR TYPED NAME OF ATTORNEY IN FACT)

PERFORMANCE BOND TO ACCOMPANY CONTRACT

KNOW ALL MEN BY THESE PRESENTS:

THAT WHEREAS, The State of California, acting by and through the Department of Parks and Recreation, has awarded to _____ a corporation existing under and by virtue of the laws of the State of California as principal, hereinafter designated as the "Contractor", a contract for the work described as follows:

AND WHEREAS, Said Contractor is required to furnish a bond in connection with said contract, guaranteeing the faithful performance thereof;

NOW, THEREFORE, We the undersigned Contractor and surety are held and firmly bound unto the State of California, in the sum of _____ and No Cents (\$_____) to be paid to the State or its certain attorney, its successors and assigns; for which payment, well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors or assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH,

That if the above bound Contractor, 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 agreements in the foregoing contract 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 the State of California, its officers and agents, as therein stipulated, then this obligation shall become and be null and void; otherwise, it shall be and remain in full force and virtue.

IN WITNESS WHEREOF, We have hereunto set our hands and seals on this _____ day of _____, 20____.

By _____

Contractor

Name of Surety

(Seal)

By _____

Attorney-in-Fact

NOTE: Signatures of those executing for the surety must be properly acknowledged, and a Power of Attorney attached.

CERTIFICATE OF ACKNOWLEDGEMENT

State of California

County of _____ ss

On this _____ day of _____ in the year 20____ before me, a notary public in and for

The county and state aforesaid, personally appeared _____
(Attorney-in-Fact)

Known to me to be the person whose name is subscribed to the within instrument and known to me to be the Attorney-in-Fact of

_____ and acknowledged to me that he subscribed the name of the said company thereto as surety, and his own name as Attorney-in-Fact.

(SEAL)

NOTARY PUBLIC

STD. 204 (Rev. 6-2003)(CA ST PKS. EXCEL 9/22/2004)

1	INSTRUCTIONS: Complete all information on this form. Sign, date, and return to the State agency (department/office) address shown at the bottom of this page. Prompt return of this fully completed form will prevent delays when processing payments. Information provided in this form will be used by State agencies to prepare Information Returns (1099). See reverse side for more information and Privacy Statement. NOTE: Governmental entities, federal, State, and local (including school districts), are not required to submit this form.		
2	PAYEE'S LEGAL BUSINESS NAME (Type or Print) SOLE PROPRIETOR— ENTER NAME AS SHOWN ON SSN (Last, First, M.I.) EMAIL ADDRESS MAILING ADDRESS BUSINESS ADDRESS CITY, STATE, ZIP CODE CITY, STATE, ZIP CODE		
3	PAYEE ENTITY TYPE CHECK ONE BOX ONLY	ENTER FEDERAL EMPLOYER IDENTIFICATION NUMBER (FEIN): ☐ PARTNERSHIP ☐ ESTATE OR TRUST ☐ INDIVIDUAL OR SOLE PROPRIETOR ENTER SOCIAL SECURITY NUMBER: (SSN required by authority of California Revenue and Tax Code Section 18646)	NOTE: Payment will not be processed without an accompanying taxpayer I.D. number.
4	PAYEE RESIDENCY STATUS	☐ California resident - Qualified to do business in California or maintains a permanent place of business in California. ☐ California nonresident (see reverse side) - Payments to nonresidents for services may be subject to State income tax withholding. ☐ No services performed in California. ☐ Copy of Franchise Tax Board waiver of State withholding attached.	
5	I hereby certify under penalty of perjury that the information provided on this document is true and correct. Should my residency status change, I will promptly notify the State agency below. AUTHORIZED PAYEE REPRESENTATIVE'S NAME (Type or Print) TITLE SIGNATURE DATE TELEPHONE ()		
6	Please return completed form to: Department/Office: _____ Unit/Section: _____ Mailing Address: _____ City/State/Zip: _____ Telephone: () _____ Fax: () _____ E-mail Address: _____		

PAYEE DATA RECORD

STD. 204 (Rev. 6-2003)(REVERSE)(CA ST PKS, EXCEL 9/22/2004)

1	<u>Requirement to Complete Payee Data Record, STD. 204</u> A completed Payee Data Record, STD. 204, is required for payments to all non-governmental entities and will be kept on file at each State agency. Since each State agency with which you do business must have a separate STD. 204 on file, it is possible for a payee to receive this form from various State agencies. Payees who do not wish to complete the STD. 204 may elect to not do business with the State. If the payee does not complete the STD. 204 and the required payee data is not otherwise provided, payment may be reduced for federal backup withholding and nonresident State income tax withholding. Amounts reported on Information Returns (1099) are in accordance with the Internal Revenue Code and the California Revenue and Taxation Code								
2	Enter the payee's legal business name. Sole proprietorships must also include the owner's full name. An individual must list his/her full name. The mailing address should be the address at which the payee chooses to receive correspondence. Do not enter payment address or lock box information here.								
3	Check the box that corresponds to the payee business type. Check only one box. Corporations must check the box that identifies the type of corporation. The State of California requires that all parties entering into business transactions that may lead to payment(s) from the State provide their Taxpayer Identification Number (TIN). The TIN is required by the California Revenue and Taxation Code Section 18646 to facilitate tax compliance enforcement activities and the preparation of Form 1099 and other information returns as required by the Internal Revenue Code Section 6109(a). The TIN for individuals and sole proprietorships is the Social Security Number (SSN). Only partnerships, estates, trusts, and corporations will enter their Federal Employer Identification Number (FEIN).								
4	<u>Are you a California resident or nonresident?</u> A corporation will be defined as a "resident" if it has a permanent place of business in California or is qualified through the Secretary of State to do business in California. A partnership is considered a resident partnership if it has a permanent place of business in California. An estate is a resident if the decedent was a California resident at time of death. A trust is a resident if at least one trustee is a California resident. For individuals and sole proprietors, the term "resident" includes every individual who is in California for other than a temporary or transitory purpose and any individual domiciled in California who is absent for a temporary or transitory purpose. Generally, an individual who comes to California for a purpose that will extend over a long or indefinite period will be considered a resident. However, an individual who comes to perform a particular contract of short duration will be considered a nonresident. Payments to all nonresidents may be subject to withholding. Nonresident payees performing services in California or receiving rent, lease, or royalty payments from property (real or personal) located in California will have 7% of their total payments withheld for State income taxes. However, no withholding is required if total payments to the payee are \$1,500 or less for the calendar year. For information on Nonresident Withholding, contact the Franchise Tax Board at the numbers listed below: <table border="0"> <tr> <td>Withholding Services and Compliance Section:</td> <td>1-888-792-4900</td> <td>E-mail address:</td> <td>wscs.gen@ftb.ca.gov</td> </tr> <tr> <td>For hearing impaired with TDD, call:</td> <td>1-800-822-6268</td> <td>Website:</td> <td>www.ftb.ca.gov</td> </tr> </table>	Withholding Services and Compliance Section:	1-888-792-4900	E-mail address:	wscs.gen@ftb.ca.gov	For hearing impaired with TDD, call:	1-800-822-6268	Website:	www.ftb.ca.gov
Withholding Services and Compliance Section:	1-888-792-4900	E-mail address:	wscs.gen@ftb.ca.gov						
For hearing impaired with TDD, call:	1-800-822-6268	Website:	www.ftb.ca.gov						
5	Provide the name, title, signature, and telephone number of the individual completing this form. Provide the date the form was completed.								
6	This section must be completed by the State agency requesting the STD. 204.								
	<u>Privacy Statement</u> Section 7(b) of the Privacy Act of 1974 (Public Law 93-579) requires that any federal, State, or local governmental agency, which requests an individual to disclose their social security account number, shall inform that individual whether that disclosure is mandatory or voluntary, by which statutory or other authority such number is solicited, and what uses will be made of it. It is mandatory to furnish the information requested. Federal law requires that payment for which the requested information is not provided is subject to federal backup withholding and State law imposes noncompliance penalties of up to \$20,000. You have the right to access records containing your personal information, such as your SSN. To exercise that right, please contact the business services unit or the accounts payable unit of the State agency(ies) with which you transact that business. All questions should be referred to the requesting State agency listed on the bottom front of this form.								

SECTION 00700 GENERAL CONDITIONS

1.01 DEFINITIONS

- A. Acceptance (or Final Completion)** – Acceptance occurs when all the provisions and requirements of the Contract are complete and is so certified by State's Representative.
- B. Bulletin** – A Bulletin is a written order directed to Contractor and issued by State's Representative, directing a minor change or making a clarification in the Work, or requesting information from Contractor about the Work. A Bulletin is to be used for minor changes or clarifications which State's Representative believes will have no impact on the Contract Sum or Contract Time.
- C. Calendar Day (or Day)** – A Calendar Day is a day of twenty-four (24) hours measured from one midnight to the next midnight, Pacific Time. Unless otherwise indicated, a "day" shall mean a Calendar Day.
- D. Change Order (or Amendment)** – A Change Order is a written modification of the Contract Documents made in accordance with the provisions of Section 1.08 of these General Conditions and which has been signed by State and Contractor.
- E. Contract (or Contract Documents)** – The Contract shall consist of the Notice to Contractors; Instructions to Bidders; Bid Form; Bidders Bond; Standard Agreement – STD. 213; General Conditions; STD. 807, Payment Bond; Performance Bond; Special Provisions; Specifications; Plans; STD. 811, Small Business Preference and Certification; Certificate of Insurance; Addenda; Amendments; Non Collusion Affidavit; Disabled Veteran Business Enterprise Compliance Certification and Documentation; and any other provisions made a part thereto by reference.
- F. Contract Time** – The Contract Time shall be the number of Calendar Days specified in which the Work is to be completed including any adjustments and/or time extensions that may be granted by State in accordance with the terms of the Contract.
- G. Contract Sum** – The Contract Sum is the total amount of money stated in the Contract as payable to Contractor for the performance of the Work under the Contract, including authorized adjustments thereto.
- H. Contractor** – The Contractor is the person, firm, individual, partnership, company, corporation, association, joint venture, or any combination thereof, who has entered into the Contract with State.
- I. Event of Default** – An Event of Default is an action that permits termination of the Contract as described herein.
- J. Field Order** – A Field Order is a written order directed to Contractor and signed by State's Representative directing a change or making a clarification in the Work, or requesting information from Contractor about the Work. A Field Order signed by Contractor indicates receipt of the Field Order. A Field Order shall be followed by a Change Order.
- K. Legal Holidays** – Legal Holidays are every Sunday; January 1; 3rd Monday in January; February 12; 3rd Monday in February; March 31; the last Monday in May; July 4; 1st Monday in September; 2nd Monday in October; November 11; Thanksgiving Day and the following Friday; December 25; and every day so declared by the President of the United States or the Governor of California. If January 1, February 12, March 31, July 4, November 11, or December 25 falls on a Sunday, the following Monday is a holiday. If November 11 falls on a Saturday, the preceding Friday is a holiday.
- L. Milestone Date** – A Milestone Date is a significant point in the development of the Work that is illustrated on Contractor's Project Work Schedule.
- M. Not-in-Contract (NIC)** – Not -in-Contract means work not included in the Contract.
- N. Project** – The Project means the erection, construction, alteration, repair, or improvement to be accomplished under the Contract.
- O. Project Work Schedule** – The Project Work Schedule is the schedule furnished by Contractor to State in accordance with Section 1.06A(2) of these General Conditions displaying the anticipated schedule for completing the Work.
- P. Punch List** – The Punch List is the list prepared as a result of a final inspection conducted by State at the completion of the Work indicating items to be completed, corrected, and/or replaced with regard to the Work as specified in the Contract Documents.

- Q. Regular Work Hours** – Eight hours labor constitutes a legal day's work and this Work period shall occur between the hours of 8:00 a.m. and 5:00 p.m. on Working Days unless otherwise agreed by State's Representative.
- R. Schedule of Values** – The Schedule of Values is the statement furnished by Contractor to State in accordance with Section 1.09A of these General Conditions displaying the portions of the Contract Sum allotted for the various parts of the Work and the projected schedule of payment.
- S. State** – The State means the State of California, Department of Parks and Recreation (DPR) and the Director of DPR.
- T. State's Representative** – The State's Representative is the person designated by State to oversee and manage the Contract and completion of the Work on behalf of State and who is the authorized representative of State for this Project. The term State's Representative may be used interchangeably with Project Manager. **CONTRACTOR SHALL ONLY TAKE DIRECTION FROM STATE'S REPRESENTATIVE FOR THE CONTRACT AND MAY NOT RELY ON THE COMMUNICATIONS, REPRESENTATIONS OR OTHER INSTRUCTIONS OF OTHER EMPLOYEES, OFFICERS, MANAGERS, CONTRACTORS, OR AGENTS OR REPRESENTATIVES OF STATE UNLESS CONFIRMED BY STATE'S REPRESENTATIVE IN WRITING OR AS OTHERWISE, FROM TIME TO TIME, MAY BE PERMITTED BY THE PROVISIONS OF THE CONTRACT.**
- U. Subcontractor** – A Subcontractor is anyone having a direct contract with Contractor or another Subcontractor and includes one who furnishes material worked to a special design according to the Plans and/or Specifications, but does not include one who merely furnishes material not so worked.
- V. Substantial Completion** – Substantial Completion is the point at which, in the discretion of State, in accordance with Section 1.09D of these General Conditions, the Project may be used for the purpose for which it is being constructed exclusive of Punch List items which do not interfere with such use and may be completed notwithstanding use of the Project.
- W. Supplier** – A Supplier is anyone who contracts with Contractor or a Subcontractor to furnish materials or equipment for the Project.
- X. Work** – The Work is everything required to complete the Project, including, but not limited to, all labor, suppliers, material, equipment, and tools.
- Y. Working Day** – A Working Day is every day except Saturdays, Sundays, and Legal Holidays and those days not charged as Working Days pursuant to the Contract Documents.

1.02 CORRELATION AND INTENT OF CONTRACT DOCUMENTS

- A.** The General Conditions are incorporated into the Contract Documents in their entirety and may not be revised or modified in any way, except by the Supplemental Conditions.
- B.** What is required by one document shall be as binding as if required by all. In the event of conflicts among the Contract Documents, such conflicts shall be resolved by giving the documents the following order of priority: (1) The Contract between State and Contractor, as the same may be amended (Amendments and revisions of later date take precedence over those of earlier date); (2) Special Conditions; (3) General Conditions; and (4) Drawings and Specifications. Drawings govern Specifications for quantity and location, and Specifications govern Drawings for quality and performance. In the event of ambiguity in quantity or quality, the greater quantity and the higher quality shall govern. Dimensions shall be figured rather than determined by scale or rule. Full-size or large-scale details or Drawings shall govern small-scale details or Drawings.
- C.** Where conflict exists between the Contract Documents or between the Contract Documents and applicable standards under codes or ordinances promulgated by governmental bodies having jurisdiction over the Project, **CONTRACTOR SHALL BE DEEMED TO HAVE AGREED TO PERFORM THE MOST STRINGENT OR HIGHEST QUALITY WAY OF PERFORMING THE WORK.**
- D.** Should Contractor discover conflicts, omissions, or errors in the Contract Documents or have any question concerning interpretation or clarification of the Contract Documents, or if it appears to Contractor that the Work to be done or any matters relative thereto are not sufficiently detailed or explained in the Contract Documents, then, before proceeding with the Work affected, Contractor shall immediately notify State's Representative in writing, using an approved Request For Information (RFI) form, and request interpretation, clarification, or furnishing of additional detailed instructions concerning the Work. Such questions shall be resolved and instructions to Contractor issued within fourteen (14) Calendar Days by State, whose decision shall be final and conclusive. Should Contractor proceed with the Work affected before resolution, Contractor shall be responsible for any resultant damage or added cost, and Contractor shall remove, replace, or adjust the Work not in accordance with State's Representative subsequent instructions.
- E.** All costs and time incurred by Contractor to prepare, review, respond to, estimate, or otherwise process RFI's, Bulletins, Field Orders, Amendments, Schedules, Correspondence, or any other paperwork shall be part of Contractor's base contract overhead and no additional compensation will be allowed therefore.

1.03 CONTRACT BONDS

- A. When the Contract Sum exceeds five thousand dollars (\$5,000), Contractor shall furnish, in duplicate, a Payment Bond, to accompany the Contract, in an amount equal to one hundred percent (100%) of the Contract Sum securing payment for laborers, mechanics, and material suppliers used on the Work under the Contract. Payment Bonds shall be prepared on a Payment Bond to Accompany Construction Contract (STD. 807) as furnished by State.
- B. When the Contract Sum exceeds five thousand dollars (\$5,000), Contractor shall furnish, in duplicate, a Performance Bond, to accompany the Contract, in the amount equal to at least one hundred percent (100%) of the Contract Sum guaranteeing faithful performance of the Work. Performance Bonds may be prepared on standard bonding company forms.
- C. Payment and Performance Bonds shall be issued by a corporate surety authorized to transact a general surety business in the State of California. Contractor shall deliver its required bonds before the date of execution of the Contract.
- D. The bonds must remain in full force and effect for the entire length of time Contractor is involved with the Contract and shall include any warranty periods.

1.04 INSURANCE

A. Insurance Requirements

- (1) General Liability Insurance: Contractor shall procure commercial general liability insurance covering bodily injury, property damage, and personal injury with limits not less than one million dollars (\$1,000,000) per occurrence and two million dollars (\$2,000,000) general aggregate. Said policy shall apply separately to each insured against whom any claim is made or suit is brought subject to Contractor's limits of liability.
- (2) Builder's Risk/Installation Floater: During the term of this Contract, Contractor shall maintain in force, at its own expense, Builder's Risk/Installation Floater for an amount equal to the full amount of the Contract improvements, upon the project and all materials or items which is or will become the property of State pursuant to the Contract Documents, including, but not limited to, materials and other items at the work site or stored off-site with the consent of State. A copy of any applicable Builder's Risk/Installation Floater will be provided to State, and it shall be the responsibility of Contractor and each Subcontractor to satisfy itself as to the terms of such coverage, and to determine whether or not at its own cost, to carry any supplemental policy of insurance.
- (3) Motor Vehicle Liability Insurance: Contractor shall maintain motor vehicle liability insurance with limits not less than one million dollars (\$1,000,000) per accident. Such insurance shall cover liability arising out of an accident involving a motor vehicle in use by Contractor, including, but not limited to, Contractor owned, hired, and non-owned motor vehicles.
- (4) Workers' Compensation and Employer's Liability Insurance: Contractor shall maintain statutory Workers' Compensation and Employers' Liability Insurance for all of Contractor's employees who will be engaged in the performance of Work on Property, including special coverage extensions where applicable. Contractor is required to meet all requirements as stated in California Labor Code, Section 3700.

- B. **Insurance Policies** – Each policy of insurance shall: (1) Be in a form acceptable by State; (2) be written by an insurer acceptable to State; (3) be maintained at Contractor's sole expense; (4) require a minimum of thirty (30) days written notice to State prior to any cancellation, non-renewal, or modification of insurance coverage; (5) contain an endorsement naming the State of California, its officers, agents, employees, and servants as additionally insured, but only with respect to Work performed for the State of California under this Contract or permit, at no cost to State; (6) be in full force for the complete term of the Contract including any warranty periods; and (7) be primary, and not in excess, to any insurance carried by State.

C. Insurance Companies

- (1) Insurance companies issuing any of the policies required by these provisions shall have a rating classification of "A" or better and a financial size category rating of "VII" or better according to the latest edition of the A.M. Best Key Rating Guide. Any other rating classification requires State approval.
- (2) All insurance companies issuing any of the policies required by these provisions shall be licensed to do business in the State of California.

D. Certificate of Insurance

- (1) Concurrent with the execution of the Agreement, Contractor shall provide to State evidence that the insurance required to be

carried by these provisions, including any endorsement affecting the additional insured status, is in full force and effect and that premiums therefore have been paid. Such evidence shall be furnished on the insurance industry's standard ACORD Form (Certificate of Insurance) or a certified copy of the original policy, including all requirements set forth in this section.

- (2) Upon notification by State of receipt of a notice of cancellation, expiration, or any reduction in coverage, or if the insurer commences proceedings or has proceedings commenced against it, indicating the insurer is insolvent, Contractor shall provide to State evidence of replacement policy at least ten (10) Working Days prior to the effective date of such cancellation, expiration, or reduction in coverage.

E. Contractor's Additional Responsibilities

- (1) Contractor is responsible for any deductible or self-insured retention contained within the insurance program.
- (2) Contractor shall ensure that all Subcontractors procure insurance meeting the requirements of these provisions.
- (3) Upon State's request, Contractor shall provide copies of its Workers' Compensation and Employers' Liability Insurance.

- F. State's Remedies** – Should Contractor fail to keep the insurance required to be carried by these provisions in full force and effect at all times, State may, in addition to any other remedies State has, terminate this Contract immediately, and all payments due or that become due will be withheld, until notice is received by State that such insurance has been restored or replaced in full force and effect and that the premiums, therefore, have been paid to cover a period of time satisfactory to State.

1.05 STATE'S RIGHTS TO STOP PERFORMANCE AND/OR CARRY OUT WORK

- A. State's Right to Stop the Work** – If Contractor fails to correct the Work which is not in accordance with the requirements of the Contract Documents or fails to carry out the Work in accordance with the Contract Documents; or fails or refuses to provide a sufficient amount of properly supervised and coordinated labor, materials, or equipment so as to be able to complete the Work within the Contract Time; or disregards the instructions of State's Representative when based on the requirements of the Contract Documents; State may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; provided, however, the right of State to stop the Work shall not give rise to a duty on the part of State to exercise this right for the benefit of Contractor or any other person or entity and any delay resulting from such Work stoppage shall not extend any Milestone Date identified in the Contract or the required dates of Substantial or Final Completion.
- B. State's Right to Carry Out the Work** – If Contractor fails to carry out the Work in accordance with the Contract Documents and fails within a five (5) day period after written notice from State to eliminate (or commence to eliminate and thereafter work diligently to eliminate) such failure, State may, regardless of whether an Event of Default has occurred, and without prejudice to other remedies State may have, correct such deficiencies. In such case an offset may be made deducting from payments then or thereafter due Contractor the cost of correcting such deficiencies, including compensation for State's and State Representative's additional services and expenses made necessary by such default, neglect, or failure. If payments then or thereafter due Contractor are not sufficient to cover such amounts, Contractor shall promptly pay the difference to State on demand. The correction of such deficiencies by State or by others shall not relieve Contractor of any obligation or liability for the Work and shall not operate to waive any right or claim of State.

1.06 CONTRACTOR

A. Contractor's Construction Schedules

- (1) Contractor agrees to complete the Work within the number of calendar days stated on the Bid Form from the date of written notice to commence Work. This time includes ten (10) Calendar Days allowed for Contractor to begin Work and ten (10) Calendar Days for issuance and completion of the Punch List. Upon written notice to proceed, Contractor shall begin Work and shall diligently prosecute the Work, with adequate forces, to completion within the Contract Time.
- (2) Within ten (10) Calendar Days of the Notice to Proceed, Contractor shall furnish to State one (1) electronic copy and three (3) paper copies of a Critical Path Method (CPM) Project Work Schedule, in form and content satisfactory to State Representative and utilizing Microsoft Project software, presenting an orderly and realistic plan for completing the Work. The schedule shall include all scheduled Working Days, relevant work activities by trade and critical path dates. No activity on the schedule shall have a duration longer than 15 calendar days, with the exception of fabrication and procurement, unless otherwise approved. Within five (5) Working Days from the date the Project Work Schedule is furnished to State's Representative, State's Representative shall review and comment on the Project Work Schedule and approve or disapprove it, giving reasons for any disapproval. If disapproved, Contractor shall modify the Project Work Schedule and resubmit it for approval following the above stated timeframes. Additionally, Contractor shall submit one (1) electronic copy and three (3) paper copies of the updated

Critical Path Method (CPM) Project Work Schedule with each monthly Request for Payment. The Project Work Schedule shall be maintained at the work site and all revisions, along with the reasons therefore, as well as any affect on the critical path of the Work and the completion date, shall be furnished to State as soon as possible after the date of the revision, but in no event later than five (5) days after its revision.

- (3) If the progress of the Work is behind the Project Work Schedule to such an extent that State reasonably determines that Contractor will be unable to meet any of the critical path dates set forth in the Project Work Schedule, including without limitation any Milestone Date, or Contractor fails to take prompt and adequate corrective action to State's satisfaction to bring the progress of the Work in compliance with the Project Work Schedule, State may, in addition to any other right or remedy provided herein, proceed as provided in Sections 1.05, 1.07, and/or 1.11 of these General Conditions.

(4) Liquidated Damages:

- a. Failure of Contractor to complete the Work within the Contract Time will result in damages being sustained by State. It is and will be extremely difficult and impracticable to determine the actual damage which State will sustain by reason of such delay. Therefore, Contractor shall pay to State, as liquidated damages, the sum of TWO HUNDRED FIFTY DOLLARS (\$250.00) for each and every Calendar Day's delay in finishing the Work under this Contract beyond the stipulated number of days, or any adjustments thereof. State may deduct liquidated damages from funds due or that become due Contractor. Execution of the Contract shall constitute acknowledgment by Contractor that Contractor has ascertained and agrees that State will suffer damages in the amount fixed herein.
- b. Contractor shall not be assessed liquidated damages when the delay is caused by the failure of State or the owner of any utility to provide for removal or relocation of an existing utility, facility, or to perform work as indicated in the Contract Documents.

B. Shop Drawings, Product Data, and Samples

- (1) Reference in the Contract Documents to any equipment, material, article, or process by specific brand, trade name, make, or catalog number, followed by the term "or approved equal", shall be regarded as establishing a standard of quality. In such cases Contractor may, subject to State's Representative's review and approval, substitute any other brand of equal quality, utility, and availability. State's Representative shall be the sole judge of equality and suitability of substitute materials. Contractor shall bear all costs and expenses, including, but not limited to, costs and expenses related to demonstrating equality or suitability of such substitute equipment, material, article or process, and any costs or expenses of changes or adjustments necessitated by such substitutions, including, but not limited to, those related to other parts of the Work or the Work of other contractors. State's Representative's approval of any substitution shall not relieve Contractor from compliance with all requirements of the Contract Documents. Where the Contract Documents do not specifically permit the use of "approved equals" for any equipment, material, article, or process referred to by specific brand, trade name, make or catalog number, no substitutions shall be permitted except by means of the Change Order procedures as set forth in Section 1.08 of these General Conditions.
- (2) Contractor shall not be relieved of responsibility for any deviations from requirements of the Contract Documents or allowed any additional compensation by reason of State's Representative approval of Shop Drawings, Product Data, Samples or similar submittals unless Contractor has specifically informed State's Representative in writing of such deviation at the time of submittal and fully complied with Section 1.08 of these General Conditions, and State's Representative has given written approval to the specific deviation. If Shop Drawings provide detail not shown in Contract Documents, Contractor shall be deemed to have primary design-build responsibility for such items. Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals by State's approval thereof.

- C. Safety and Clean-Up** – Contractor acknowledges that State will continue to occupy and must maintain continuous operations in the Parks in which the Work is located. It is critical that these operations shall not suffer any significant interference, including, without limitation, any interruption in utilities or unreasonable noise, dust, odor, or vibration. Contractor shall perform the Work and limit its use of the Project site in such a manner as to minimize any interference with occupancies and operations in such Parks and in accordance with applicable Park rules and regulations. Contractor shall be liable for all costs for all claims related to dust, mud, noise, odor, vibration, or windblown materials attributed to the Work hereunder.

D. Potential Subcontractors

Nothing contained in this agreement or otherwise, shall create any contractual relation between State and any subcontractors, and no subcontract shall relieve Contractor of its responsibilities and obligations hereunder. Contractor agrees to be as fully responsible to State for the acts and omissions of its subcontractors and of persons either directly or indirectly employed by any of them as it is for the acts and omissions of persons directly employed by Contractor. Contractor's obligation to pay its subcontractors is an

independent obligation from State's obligation to make payments to Contractor. As a result, State shall have no obligation to pay or to enforce the payment of any moneys to any subcontractor.

E. Force Majeure

Except for defaults of subcontractors, neither party shall be responsible for delays or failures in performance resulting from acts beyond the control of the offending party. Such acts shall include but shall not be limited to acts of God, fire, flood, earthquake, other natural disaster, nuclear accident, strike, lockout, riot, freight embargo, public regulated utility, or governmental statutes or regulations superimposed after the fact. If a delay or failure in performance by Contractor arises out of a default of its subcontractor, and if such default of its subcontractor, arises out of causes beyond the control of both Contractor and subcontractor, and without the fault or negligence of either of them, Contractor shall not be liable for damages of such delay or failure, unless the supplies or services to be furnished by subcontractor were obtainable from other sources in sufficient time to permit Contractor to meet the required performance schedule.

1.07 ADMINISTRATION OF THE CONTRACT

A. Claims and Disputes

- (1) Time Limits on Contractor Claims: Except where a shorter time period is provided herein, claims by Contractor arising during the course of construction, including claims for additional costs, must be made within five (5) days after occurrence of the event giving rise to such claim or within five (5) days after Contractor first recognizes or reasonably should have recognized the condition giving rise to the claim. Claims must be made by written notice to State within five (5) days following such event.
- (2) Continuing Contract Performance: Contractor, in the event of any claim or dispute with State over any matter whatsoever, shall not cause any delay or cessation in Contractor's Work and shall proceed with all Work called for in the Contract Documents and/or required to complete the Project.
- (3) Claims for Additional Cost: If Contractor wishes to make a claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Said notice shall itemize all claims, shall differentiate between extra work and base contract work, and shall contain sufficient detail and substantiating data to permit evaluation of same by State's Representative. Any change in the Contract Sum resulting from such approved claim shall only be authorized by a Change Order.
- (4) Claims for Additional Time: If Contractor wishes to make claim for an increase in the Contract Time, written notice as provided herein shall be given. Contractor's claim shall include an estimate of cost and the probable effect of delay on progress of the Work and shall document any adverse effect on the Project Work Schedule. In the case of a continuing delay, only one claim is necessary.
- (5) Claim Certification: Any claim for additional cost or time must include the following certification, signed by the Contractor's legal representative: "I certify under penalty of perjury, according to the Laws of the State of California, that this claim is made in good faith, that the supporting documentation is accurate and complete, and that the amount requested accurately reflects the contract adjustments for which the Department is responsible."
- (6) Delays in and Extensions of Time:
 - a. If (a) Work on the critical path as shown on the Project Work Schedule is delayed at any time by (i) an act or neglect of State, any employee of State, or any separate contractor employed by State, (ii) changes ordered in the Work in accordance with the provisions of Article 7, (iii) unusually severe and/or abnormal weather conditions which preclude the safe performance of the Work, (iv) national conflicts or priorities arising therefrom, (v) fires beyond the reasonable control of Contractor, (vi) floods beyond the reasonable control of Contractor, (vii) earthquakes, (viii) off-site or area-wide labor disputes which are beyond the reasonable control of Contractor, (ix) civil disturbances and for no other cause or causes; (b) Contractor would otherwise have been able timely to perform its obligations under the Contract Documents but for such delay; (c) Contractor has taken reasonable precautions to foresee, prevent and to mitigate the effects of delays to Work on the critical path due to such causes; and (d) Contractor has given written notice as required by Section 1.08 of these General Conditions; then subject to the provisions of Section 1.07 of these General Conditions, the Contract Time shall be appropriately extended by Change Order by the number of Working Days of delay on the critical path of the Work actually and directly caused by such occurrence. Such extension of Contract Time shall be net of any delays caused by or due to the fault or negligence of Contractor or which are otherwise the responsibility of Contractor or its agents or Subcontractors, and shall also be net of any contingency or "float" time allowance included in the Project Work Schedule. State may, at its option, authorize extra Work in order to accelerate the Project Work Schedule and minimize or eliminate the impact of the delay. No extension shall be made or allowed nor shall such extra Work be authorized unless a written request therefor by Contractor is made within five (5) Calendar Days after the first occurrence of the delay. Any claims of Contractor relating

to time shall be made promptly in accordance with the applicable provisions of Section 1.08 of these General Conditions, or shall be deemed waived.

- b. If adverse weather conditions are the basis for a claim for additional Contract Time, such claim shall be documented by data substantiating that weather conditions were abnormal for the period of time and could not have been reasonably anticipated, and that weather conditions had a direct and adverse effect on scheduled critical path activities.
 - c. Adjustments in compensation for delays or time extensions will be allowed only for the causes specified in (i) and (ii) of paragraph 1.07A(6)a above, which extend the overall project duration.
- (7) Disputes Resolution: A claim or dispute arising out of or relating to the Contract Documents which is not disposed of by agreement between Contractor and State shall be decided by State's Representative promptly, but not longer than ten (10) Working Days from the date Contractor notifies State's Representative in writing that agreement on a dispute cannot be reached and a written decision from State's Representative is required. The decision of State's Representative shall be final and conclusive on Contractor unless, within fifteen (15) days from the receipt of such decision, Contractor submits to State's Representative a written request for review of the decision made by State's Representative. The Director, or a designee other than State's Representative, shall review all decisions and render a decision in writing on or before thirty (30) days from the date of receipt of written position statements by Contractor and State's Representative as provided for herein. Contractor and State's Representative shall be afforded an opportunity to be heard by way of written submissions and to offer relevant information with respect to the matter in question.
- (8) Decision of Director is Final: The decision of the Director or her or his designee shall be final and conclusive on Contractor, unless, within fifteen (15) Working Days from receipt of such decision, Contractor submits to State's Representative a written notice of Contractor's election to reserve its rights to file a claim with the State Board of Control and seek further adjudication of such claim should such claim be rejected by the State Board of Control.
- (9) Arbitration: Claims (demands for monetary compensation of damages) arising out of related to the Contract Documents shall be resolved by arbitration unless State and Contractor agree in writing, after the claim has arisen, to waive arbitration and to have the claim litigated in a court of competent jurisdiction. Arbitration shall be pursuant to California Public Contract Code, Section 10240 et seq., and applicable regulations, Title 1, California Code of Regulations, Section 301 et seq. The arbitration decision shall be decided under and in accordance with the laws of the State of California, supported by substantial evidence and, in writing, contain the basis for the decision, findings of fact, and conclusions of law. Arbitration shall be initiated by a Demand for Arbitration made in compliance with the requirements of above referenced regulations. A Demand for Arbitration by Contractor shall be made not later than 180 days after date of service in person or by mail on Contractor of the final written decision by State on the claim. (This Section only applies to Contracts that exceed \$117,000.00.)
- (10) Exhaust All Administrative Remedies: Contractor must exhaust all remedies and comply with all disputes resolution procedures set forth in the proceeding section prior to filing any legal action which names the Department of Parks and Recreation, State of California, or any officer, employee, agent or affiliate of any of them. In no event, may Contractor bring any claims or pursue legal action for damages or other remedies for issues or matters not raised and presented in written notifications as provided for in the Contract Documents and as set forth in all written requests for review by State's Representative.

1.08 CHANGES IN THE WORK

- A. Change Orders (Amendments)** – When adjustments in the Contract Sum and Contract Time are determined, such determination shall be effective immediately and shall be recorded by preparation and execution of an appropriate Change Order. A Change Order signed by Contractor indicates Contractor's final and binding agreement therewith, including the adjustment in the Contract Sum or the Contract Time. No Change Order shall authorize an adjustment in the Contract Sum or Contract Time unless such Change Order specifies such adjustment. If no adjustment in either or both the Contract Sum and the Contract Time is specified, Contractor's execution of the Change Order shall constitute Contractor's agreement that no such adjustment shall be made. Contractor agrees that in no event shall it make any subsequent claim relating to the items covered by an executed Change Order, whether direct, indirect, or consequential in nature. All Change Orders are subject to the approval by the Department of General Services, if required.
- B. Bulletins and Field Orders**
- (1) A Bulletin or Field Order shall not be recognized as having any impact upon the Contract Sum or the Contract Time. Contractor shall have no Claim therefor unless, within five (5) days from the date such direction or order was given, Contractor submits a written Change Order Request to the State's Representative with estimates of any adjustment in the Contract Sum or Contract Time to which Contractor believes it is entitled as a result of the change in the Work described in the Bulletin or Field Order, including sufficient detail to allow evaluation by the State's Representative.
- (2) Upon receipt of a Bulletin or Field Order, Contractor shall promptly proceed with the Work involved, or as otherwise directed by the Bulletin or Field Order.

C. Pricing Changes

- (1) When submitting its change proposal, Contractor shall include and set forth in clear and precise detail, breakdowns of labor, materials and allowable costs for all trades involved and the estimated impact on the Project Work Schedule. If requested by State, Contractor shall furnish spread sheets from which the breakdowns were prepared, plus spread sheets, if requested, of any Subcontractors. Allowable costs to be included in Contractor's change proposal shall be strictly limited to those set forth in Section 1.08C(2) of these General Conditions.
- (2) In the event that (a) State approves a Change Order to be priced on a time and material basis, (b) State issues a Field Order to proceed with a change in the Work, Contractor timely notifies State of Contractor's belief that it is entitled to an adjustment in the Contract Sum or the Contract Time as a result of such change, and State and Contractor cannot agree on the amount of such adjustment, (c) Contractor is entitled to compensation as the result of a concealed condition, or (d) the Contract Sum includes allowances, then the amount of Contractor's allowable costs shall be governed by this Subsection. Allowable costs include and shall be strictly limited to the following:
 - a. The actual and reasonable cost of additional materials required as a result of such change, purchased by Contractor (or any Subcontractor) and used in the Work, including sales taxes, freight and delivery charges.
 - b. Construction equipment costs shall be substantiated by vendor's invoices. In no event shall the cost of such items exceed (1) the average current wholesale prices at which the items are locally available in the quantities required, delivered to the site, less applicable cash or trade discounts or (2) the equipment rental rates in the Labor Surcharge and Equipment Rental Rates published by Caltrans; whichever is less. The allowable rate constitutes full compensation to the Contractor including cost of fuel, oil, lubrication, supplies, necessary attachments, repairs, maintenance, depreciation, storage, insurance, labor except for construction equipment operators, and incidentals. No costs will be allowed for time while construction equipment is inoperative, idle or on standby, unless approved by the State.
 - c. Labor costs including welfare and fringe benefits shall be the actual labor cost, required as a result of such change in the Work, including no more than one (1) working foreman, but not including any supervisory or administrative personnel. Labor costs shall not exceed the local prevailing wage, which includes the Straight-Time Total Hourly Rate plus Burden. Burden shall be limited to the actual FICA-OASDI, FUTA, SUI, and Workers' Compensation payment percentages multiplied by the sum of the Basic Hourly Rate and Vacation/Holiday payments. Labor costs shall be substantiated by daily time cards (signed by Contractor's Superintendent) and labor summaries.
 - d. The cost of Work performed by Subcontractors or sub-Subcontractors is based on the actual direct costs of material, labor, and construction equipment and is determined pursuant to the provisions of this Subsection.
 - e. For deleted Work otherwise required to be performed hereunder, the Contract Sum shall be reduced by an amount equal to the net savings to Contractor and all Subcontractors and sub-Subcontractors on account of the deleted work for material, labor, and construction equipment.
- (3) Failure of Contractor and State to agree on an adjustment of the Contract Sum or extension of Contract Time for performance under the Contract Documents shall not excuse Contractor from proceeding with the prosecution and performance of the Work as changed. State shall have the right within its sole discretion to require Contractor to commence performance of changes to the Work. If Contractor and State cannot agree on an appropriate stipulated sum for any change, the adjustment to the Contract Sum, if any, shall, subject to the provisions of Section 1.08 of these General Conditions, be determined by State on the basis of the allowable costs incurred as a result of such change as set forth in Section 1.08C(2) plus a fee as set forth in Section 1.08C(4).
- (4) In addition to the allowable costs incurred for a change, Contractor (and any Subcontractors) is entitled to a fee. Such fee shall be included in any agreed upon stipulated sum for the Change Order and shall be added to the allowable costs for Change Orders priced on a time and material basis or as to which no agreement is reached. The additional fee shall be Contractor's (and Subcontractor's) sole reimbursement for overhead, profit and any other cost (including insurance required in the Contract Documents) not specifically reimbursable under the Contract for Construction. No such fee shall be applied to gross receipts or use tax amounts or bond premiums paid by Contractor. The following fees shall apply to Contractor and all Subcontractors and represent the maximum fees chargeable on each Contract tier, who shall receive mark-ups for all categories on a percentage basis equal to Contractor's Fee stated in the Contract:
 - a. For Work to be performed by Subcontractors, such Subcontractors, cumulative of all tiers, shall be permitted an additional fee of fifteen percent (15%) of the allowable costs incurred by such Subcontractors;
 - b. For Work to be performed by Contractor's own forces, Contractor shall be permitted an additional fee in the amount of fifteen percent (15%) of the allowable costs incurred directly by Contractor;

- c. For Work to be performed by Subcontractors, Contractor shall be permitted an additional fee in the amount of five percent (5%) of the sum of the allowable costs incurred by Subcontractors plus the allowance for Subcontractors' fee provided in Subsection 4(a) above.

1.09 PAYMENTS AND COMPLETION

- A. **Schedule of Values** – The apparent low bidder, within ten (10) days, not including Saturdays, Sundays, and Legal Holidays, after receiving notice that he/she is the apparent low bidder, shall submit along with the contract documents a complete itemized Schedule of Values that includes, but is not necessarily limited to, the cost of each line item equal to or greater than one and one-half percent of the contractor's total bid and every work item (activity) shown on the Contract Critical Path Method (CPM) Project Work Schedule. The sum of the cost of all activities in the Schedule of Values shall equal the Contract Amount. Contractor's mobilization, profit, fees, taxes, overhead and General Conditions must be itemized separately and not be prorated across other categories. The Schedule of Values, when approved by State's Representative, shall be used to monitor the progress of the Work and as a basis for payment requests. Each item shall show its total Scheduled Value, value of previous applications, value of the application, percentage completed, total value completed and value yet to be completed. All blanks and columns must be filled in, including every percentage complete figure. Contractor is to add approved Change Orders (Amendments) to the Schedule of Values on a monthly basis.
- B. **Request for Payment** – Contractor shall submit to State an itemized request for payment no more than once each 30 day period for operations completed in accordance with the Schedule of Values. Such request shall be supported by such data substantiating Contractor's right to payment as State's Representative may require, such as copies of requisitions from Subcontractors and material suppliers, and reflect retainage. Any allowance included in the request for payment shall be separately itemized with supporting data attached. Progress payments for mobilization shall not exceed that authorized in Section 10264 of the Public Contract Code. Contractor shall furnish with each request for payment:
 - (1) Cost data to support the application, including without limitation, copies of Subcontractor's pay requests accurately reflecting current percentage of completion on a line-item basis.
 - (2) One (1) certified copy of all payroll records for the month.
 - (3) One (1) electronic copy and three (3) paper copies of the updated Project Work Schedule reflecting the current status of the project.
 - (4) One (1) originally signed Unconditional Waiver and Release Upon Progress Payment for all Subcontractor work paid to date.
- C. **Retention**
 - (1) Ten percent (10%) shall be retained from each progress payment and held by State. After the Punch List has been issued, retainage may be adjusted to five percent (5%) of all amounts billed or two (2) times the value of the Punch List Work, whichever is more, until Final Completion of the Work.
 - (2) Contractor may elect, upon prior notice to State, to retain additional sums, over the ten percent (10%) required, from a Subcontractor. If, however, such additional retainage is made, then an equal amount shall be retained by State from Contractor.
 - (3) Section 10263 of the Public Contract Code pertaining to security deposits in lieu of retentions is incorporated, herein, in full by this reference. Pursuant to that Section, Contractor may, for contracts subject to the State Contract Act, request substitution of eligible securities for such retentions prior to issuance of original contract documents. Contractor hereby agrees to execute said securities using a State-furnished standard excrow agreement.
- D. **Substantial Completion**
 - (1) Substantial Completion is the stage in the progress of the Work when, exclusive of Punch List items, the Work or designated portion thereof (which State agrees to accept and occupy and utilize separately) is sufficiently complete in accordance with the Contract Documents so State can legally and practically occupy and utilize the Work for its intended use, except for Work outside the scope of the Contract Documents.
 - (2) Objections to Certificate of Substantial Completion (DPR 248)/Notice of Completion (DPR 249): Contractor shall have seven (7) Working Days after receipt of the Certificate of Substantial Completion (DPR 248) during which Contractor may make written objection to State as to provisions of the Certificate of Substantial Completion and Punch List. If, after considering such objection, State concludes that the Project is not substantially complete, State shall, within seven (7) days after submission of the objection notify the Contractor thereof in writing stating the reasons. Upon Contractor's completion of the items listed on the Punch List and upon satisfaction of the terms and conditions of the Certificate of Substantial Completion, State shall issue a final

Notice of Completion (DPR 249), which shall fix a date as may be necessary or appropriate. State's determination of the Date of Substantial Completion and other items under this paragraph shall be final and conclusive on Contractor.

E. Partial Occupancy or Beneficial Use

- (1) State and its lessees and separate Contractors may occupy or use any completed or partially completed portion of the Work at any stage of construction regardless of whether the Contract Time has expired (hereinafter sometimes referred to as "Partial Occupancy"). Such Partial Occupancy may commence whether or not the applicable portion of Work is substantially complete.
- (2) It shall be understood, however, that Partial Occupancy shall not: (a) constitute final acceptance of any Work; (b) relieve Contractor for responsibility for loss or damage because of or arising out of defects in, or malfunctioning of, any Work, material, or equipment, or from any other unfulfilled obligations or responsibilities under the Contract Documents; or (c) commence any warranty period under the Contract Documents, provided that Contractor shall not be liable for ordinary wear and tear resulting from such Partial Occupancy.

F. Testing, Inspection, Final Inspection, and Acceptance

- (1) Testing, inspection, and approval of portions of the Work required by the Contract Documents shall be made by an independent Testing Laboratory arranged and paid for by the Contractor and approved by the State. Contractor shall promptly furnish two certified copies of test results and inspection records to the State Representative. Material and equipment shall not be incorporated into the project until test results indicate conformance to the Contract Documents.
- (2) Authorized employees of State shall have access to the Work at all times. Contractor shall give State's Representative forty-eight (48) hours advance notice of what Work and when the Work will be ready for inspection. Contractor shall provide proper facilities for such access and inspection. Inspection of the Work shall not relieve Contractor of any obligations to fulfill the Contract as prescribed. Any Work covered or concealed by Contractor before approval by State's Representative, shall, if required to be uncovered for examination and recovered, be at Contractor's sole expense.
- (3) When the Work is completed, Contractor shall notify State's Representative and shall request final inspection. Within five (5) Calendar Days, State's Representative shall make final inspection. Contractor shall be notified in writing of any deficiencies (Punch List). Contractor shall remedy these deficiencies to complete satisfaction of State. After all the Work under this Contract has been completed and is so certified by State's Representative, formal acceptance will be made in writing by State by filing a Notice of Completion (DPR 249) for recording in the county in which the Work was performed.

1.10 UNCOVERING AND CORRECTION OF WORK

Correction of Work – If, within one (1) year after the date of Final Completion of the entire Work, or within such longer period of time as may be prescribed by laws or in equity or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be defective or otherwise not in accordance with the requirements of the Contract Documents, Contractor shall correct it promptly after receipt of written notice from State to do so unless State has previously given Contractor a written acceptance of such condition. Corrective Work shall be warranted to be free from defects for a period equal to the longer of six (6) months after the completion of the corrective Work or one (1) year after the Date of Final Completion or such longer period of time as may be prescribed by law or in equity, or expiration of the term of any applicable special warranty required by the Contract Documents whichever is longer. Any defect in such Work shall be corrected again by Contractor promptly upon written notice of the defect from State. The obligations under Section 1.10 of these General Conditions shall survive acceptance of the Work under the Contract for Construction and termination of the Contract for Construction. If Contractor fails to correct such Work, State may proceed to have the work corrected at Contractor's expense and Contractor shall pay the cost thereof on demand.

1.11 TERMINATION OR SUSPENSION OF THE CONTRACT

A. Termination by Contractor

- (1) Contractor may terminate in writing, the Contract in the manner provided in Section 1.11 of these General Conditions if the Work is entirely stopped for a continuous period of thirty (30) days through no act or fault of Contractor or a Subcontractor, sub-Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with Contractor, for any of the following reasons:
 - a. Issuance of an order of a court or other public authority having jurisdiction.
 - b. An act of government, such as a declaration of national emergency, making material unavailable.

- (2) If one of the above reasons exists, Contractor may, upon fourteen (14) days written notice to State's Representative, terminate the Contract, unless this reason is cured prior to the expiration of the notice period, and recover from State payment for Work properly executed in accordance with the Contract Documents, excluding any anticipated profits from uncompleted Work, and payment for costs directly related to Work thereafter performed by Contractor in terminating such Work, including reasonable demobilization charges, provided said Work is authorized in advance by State's Representative and State.

B. Termination by State

- (1) State may terminate the Contract if State deems any of the following conditions to exist:
- a. Contractor refuses or fails to supply enough properly skilled workers or proper materials or equipment.
 - b. Contractor fails to make prompt payment to Subcontractors for materials or equipment or labor in accordance with the respective agreements between Contractor and Subcontractors.
 - c. Contractor disregards laws, ordinances, or rules, regulations, or orders of a public authority having jurisdiction, including, without limitation, environmental rules and regulations and health and safety codes.
 - d. Contractor disregards the instructions of State's Representative (when such instructions are based on the requirements of the Contract Documents).
 - e. In accordance with applicable law, and if permitted by such law, Contractor is the subject of a voluntary or involuntary petition in bankruptcy, or makes a general assignment for the benefit of Contractor's creditors, or a trustee or receiver is appointed for Contractor or for any of its property, or files a petition to take advantage of any debtor's act, or to reorganize under bankruptcy or similar laws.
 - f. Contractor has all or substantially all of its assets, equipment, or materials in any way connected with the work, executed upon or judicially seized, when such attachment or seizure remains undismissed for seven (7) days after levy thereof.
 - g. Contractor has imposed against it a federal or state tax lien.
 - h. Contractor fails to diligently prosecute the Work and/or correct deficiencies.
 - i. Contractor fails to maintain the proper license to perform the Work prescribed by this Contract.
- (2) When any of the above reasons exist, State may, without prejudice to any other rights or remedies of State and after giving Contractor and Contractor's surety, if any, seven (7) days prior written notice (except in cases of emergency, as reasonably determined by State), terminate the Contract and may:
- a. Take possession of the site and Project and of all materials, equipment, tools, and construction equipment and machinery thereon owned, rented, or leased by Contractor; and
 - b. Finish the Work by whatever method State may deem expedient.
 - c. Tender completion of the Work to Contractor's surety, if any, in accordance with terms of the Performance Bond.
- (3) When State terminates the Contract for one of the reasons stated in Subsection 1.11B(1) of these General Conditions, Contractor shall not be entitled to receive further payment until the Work is finished and a final accounting is completed as to the proper sums due Contractor under the terms of the Contract.
- (4) To the extent the costs of completing Work, including compensation for additional professional services and expenses, exceed those costs which would have been payable to Contractor to complete the Work except for Contractor's default, Contractor will pay the difference to State. This obligation for payment shall survive termination of the Contract. Such costs incurred by State shall be determined by State.

- C. Suspension by State for Convenience** – State may, at any time, at will and without cause, suspend, delay, or interrupt any part of the Work or all the Work for any reason whatsoever for such period of time as State may determine by giving seven (7) days' prior written notice to Contractor specifying the part of the Work to be suspended, delayed, or interrupted and the effective date of such suspension, delay, or interruption, as the case may be. Contractor shall continue to perform the part of the Work not suspended, delayed, or interrupted and shall properly protect and secure the part of the Work so suspended, delayed, or interrupted, so far as is necessary in State's reasonable opinion. Notwithstanding Subsection 1.11B of these General Conditions, if any part of the Work is so suspended, delayed, or interrupted, Contractor shall be entitled to payment of reasonable standby fees (or at State's option, payment

for demobilization) and costs directly associated with protecting and securing the affected Work, provided said costs are authorized in advance by State's Representative. No payment shall be made by State, however, to the extent that such Work is, was, or could have been suspended, delayed, or interrupted under the Contract Documents or an equitable adjustment is made or denied under another provision of the Contract for Construction. In case of such suspension, delay, or interruption, State will issue a Change Order making any required adjustment to the Contract Time and/or the Contract Sum. For the remainder of the Work, the Contract Documents shall remain in full force and effect.

1.12 EMPLOYEES

For each phase and type of Work, Contractor shall employ journey level people skilled in their respective trades and skilled in the use of methods, tools, and appliances developed in order to obtain the highest quality of workmanship throughout the Project. Any person State may deem incompetent or disorderly must be promptly removed by Contractor and not re-employed on the Project.

1.13 PREVAILING WAGE

- A.** The Notice to Contractors stipulates the prevailing wage rates applicable to the classes of labor to be used on this Project.
- B.** Contractor shall abide by the laws and regulations set forth pursuant to California Labor Code, Sections 1720 et seq., and Title 8, California Code of Regulations, Section 16000 et seq.

1.14 TRAVEL AND SUBSISTENCE PAYMENTS

Contractor shall make travel and subsistence payments to each worker needed to execute the Work, as such travel and subsistence payments are defined in the applicable collective bargaining agreements filed in accordance with Labor Code Section 1773.8.

1.15 APPRENTICES

Special attention is directed to California Labor Code, Sections 1777.5, 1777.6, and 1777.7, and Title 8, California Code of Regulations, Section 200 et seq. Each Contractor and Subcontractor must, prior to commencement of the Public Works Contract, contact the Division of Apprenticeship Standards, 455 Golden Gate Avenue, San Francisco, California, 94102, or one of its branch offices to ensure compliance and complete understanding of the law regarding apprentices and specifically the required ratio thereunder. Responsibility for compliance with this section lies with the prime Contractor. For further information, the website for the Division of Apprenticeship Standards can be accessed at: www.dir.ca.gov.

1.16 SANITARY FACILITIES

Contractor shall provide potable drinking water, and sanitary toilet facilities for Contractor's workers unless the use of existing facilities is authorized by State's Representative. Contractor shall locate temporary facilities as directed by State's Representative and maintain such facilities in good repair and in a sanitary condition. Contractor shall remove such facilities completely at the conclusion of the Work.

1.17 OBSERVANCE OF PARK RULES AND REGULATIONS

The Work to be done is within the jurisdiction of the State Park System. All persons entering the premises for whatever reason are subject to the "Rules and Regulations" for the State Park System, as set forth in Title 14, California Code of Regulations, Division 3, Chapters 1 and 2. Any person who fails to observe these "Rules and Regulations" may be barred from further work in the State Park System.

1.18 RESPONSIBILITY FOR INJURY AND DAMAGE

- A.** Contractor shall be responsible for damage to or loss of property regardless of cause, or for injury or loss of life to persons employed on this Project and to the general public, which arise from operations under this Contract.
- B.** From the formal Start Work Date until formal acceptance of the Work, Contractor is responsible to save from injury and damage by whatever cause all of the Work under this Contract, except as provided in Section 7105 of the Public Contract Code. Contractor shall rebuild, restore, and/or repair any such injury or damage, at Contractor's sole expense, before formal acceptance.
- C.** State is hereby relieved at all times from an indebtedness or claim other than the Contract Sum.

1.19 COOPERATION BETWEEN CONTRACTOR AND STATE

- A.** When the Contract is approved, Contractor will be notified in writing by State of the formal Start Work Date, the Contract completion date, and the name and location of State's Representative responsible for inspection of the Work. Contractor shall start Work within ten (10) Calendar Days of the formal Start Work Date and diligently pursue the Work to completion.

- B.** If Work is suspended for more than three (3) Calendar Days "due to Contractor's actions" or "due to no fault of State," Contractor shall immediately inform State's Representative in writing as to the rescheduling of the Work.
- C.** Contractor shall be responsible for notifying the surety or sureties, furnishing bonds for the Contract, of all changes to the Contract.
- D.** No Work shall be done except on Working Days and during Regular Work Hours unless Contractor has submitted a written request to State's Representative not less than five (5) Calendar Days in advance of each occurrence and State has given written approval. State may reject, without further reason, any work done in violation of this Subsection.

1.20 PERMITS, LAWS, AND REGULATIONS

- A.** State shall obtain and pay for the permits as indicated in the Project Manual. Contractor is responsible for all other permits. Notwithstanding that State obtains any permits required for the Work, Contractor shall not be relieved of any responsibility for compliance with laws and codes, including without limitation, building codes, pertaining to the Work. Contractor shall pay all public utility usage charges, for utilities consumed during the Work, including any applicable connection charges, which apply to the Work.
- B.** No building permits from city or county governments are necessary for Work on State projects.
- C.** Contractor shall comply with the current edition of Title 24, California Code of Regulations, and the various safety orders and codes of the State of California where applicable.
- D.** All records of Contractor, subcontractors, and suppliers that pertain to the performance of the work or are necessary to determine or verify compensation, including, but not limited to, all documents used to prepare the bid shall be retained for a period of three years after final payment for examination or audit by the State. The State may examine and copy all records including, but not limited to, paper, electronic, and photographic documents.

1.21 STORAGE OF EQUIPMENT AND MATERIALS

- A.** State's Representative shall inform Contractor of the availability of suitable areas for the storage of Contractor's equipment and materials. Contractor shall maintain the storage of equipment and materials within the confines of the area designated by State's Representative.
- B.** Contractor shall store materials intended for use on this Project in such a manner that their quality and fitness for the Work will be preserved. When considered necessary by State, materials shall be stored so as to facilitate inspection. It shall be Contractor's responsibility to protect those stored items. All stored materials remain the property of the Contractor until such time as they are installed in their final position as intended in the Contract Documents.
- C.** Routes of hauling and parking vehicles and equipment beyond the limits of the existing roads shall be only as directed by State's Representative.

1.22 SITE CONDITIONS

- A.** State may furnish reports, surveys, or other information describing physical characteristics, legal limitations and utility locations for the Project site, and a legal description of the site. The furnishing of this information is for the convenience of Contractor only and shall not relieve Contractor from its duties under the Contract Documents in general. In performance of the Work, Contractor shall undertake such further investigations and studies as may be necessary or useful to determine subsurface characteristics and patent and concealed conditions. In connection with the foregoing, Contractor shall be solely responsible for locating (and shall locate prior to performing any Work) all utility lines, telephone company lines and cables, sewer lines, water pipes, gas lines, electrical lines, including, without limitation, all buried pipelines and buried telephone cables and shall perform the Work in such a manner so as to avoid damaging any such lines, cables, pipes, and pipelines. Utility points of connection and other site relationships referenced in the contract documents are diagrammatic in nature. The exact location and routing requirements are the responsibility of the Contractor and are subject to the approval of the State's Representative.
- B.** The Contractor shall visit the Project site and verify all existing conditions prior to preparing its bid, in accordance with Parts 1.01 and 1.02 of Section 00100 Public Works, Instructions to Bidders. No additional compensation will be allowed for any conditions described in the Contract Documents or reasonably anticipated from pre-bid examination and observation of the Project site.
- C. Differing Site Conditions**
 - (1)** During the progress of the Work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the Contract or if unknown physical conditions of an unusual nature, are encountered at the site, Contractor shall promptly notify State in writing of the specific differing conditions before they are disturbed and before the affected Work is performed.

- (2) Upon written notification, State's Representative will investigate the conditions, and if State's Representative determines that the conditions materially differ and cause change in the cost or time required for the performance of any Work under the Contract, an adjustment, excluding loss of anticipated profits, will be made and the Contract modified in writing accordingly. State's Representative will notify Contractor of its determination whether or not an adjustment of the Contract is warranted.

- D. The construction area must be confined to the minimum space needed and be compatible with the ongoing Park Unit operations. The construction area, including all staging and laydown areas, must be approved by the State's Representative.

1.23 WARRANTIES

ALL WARRANTIES SHALL INCLUDE LABOR AND MATERIALS AND SHALL BE SIGNED BY THE MANUFACTURER OR SUBCONTRACTOR AS THE CASE MAY BE AND COUNTERSIGNED BY CONTRACTOR. ALL WARRANTIES SHALL BE ADDRESSED TO STATE AND DELIVERED TO STATE'S REPRESENTATIVE UPON COMPLETION OF THE WORK AND BEFORE OR WITH THE SUBMISSION OF REQUEST FOR FINAL PAYMENT.

1.24 AS-BUILT PLANS

Prior to acceptance, Contractor shall furnish to State's Representative a set of Contract plans in CAD (computer-aided drafting) format unless otherwise directed by State's Representative, clearly and legibly marked showing the location, as constructed, of all elements, features, components, and utilities. The as-built plans shall provide detailed information and reference dimensions locating all concealed elements, features, components, and utilities. Each sheet must be stamped "AS-BUILT", signed and dated by the Contractor.

1.25 PROTECTION OF PERSONS AND PROPERTY

- A. Contractor shall comply with all air pollution control rules, regulations, ordinances, and statutes, which apply to any Work performed pursuant to the Contract, including, but not limited to, any air pollution control rules, regulations, ordinances, and statutes, specified in California Government Code, Section 11017.
- B. Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss. Contractor shall provide all facilities and shall follow all procedures required by the Occupational Safety and Health Act (OSHA) including, but not limited to, providing and posting all required posters and notices and shall otherwise be responsible for all other mandatory safety laws.
- C. Contractor shall not impose or permit loading upon any part of the Work, construction, site or upon or adjacent to the Work site, in excess of safe limits, or permit loading that will result in stress or damage to the structural, architectural, mechanical, electrical, or other components of the Work.

D. Hazardous Materials

- (1) Contractor shall not cause or permit any "Hazardous Materials" [as defined in Section 1.27D(2) of these General Conditions] to be brought upon, kept or used in or about the Project site except to the extent such Hazardous Materials: (a) are necessary for the prosecution of the Work; and (b) are required pursuant to the Contract Documents; and (c) have been approved in writing by State. Any Hazardous Materials allowed to be used on the Project site shall be used, stored, and disposed of in compliance with all applicable laws relating to such Hazardous Materials.
- (2) As used herein, the term "Hazardous Materials" means any hazardous or toxic substances, materials or wastes listed in the United States Department of Transportation Hazardous Materials Table, or listed by the Environmental Protection Agency as a hazardous substance, or as defined in the California Health and Safety Code, Section 25316, or any substances, materials or wastes that are or become regulated, identified, defined or listed under federal, state or local law, and all products containing such Hazardous Materials.

- E. **Spread of Exotic Biological Organisms** – Before entering the park unit and at the conclusion of the Contract, all Contractors shall remove soil and organic materials from all motorized equipment used to transport or process soil or organic matter. Contractors shall clean the hull, motor, pumps, and accessories on all watercraft before entering the park unit and at the conclusion of the Contract.

SECTION 00802
SUPPLEMENTAL CONDITIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. The following requirements either amend or supplement the following sections
1. Section 00700 – General Conditions (DPR 483)
 2. Section 00804 – Disposal of Refuse
 3. Section 01250 – Contract Modification Procedures
 4. Section 01290 – Payment Procedures
 5. Section 01330 – Submittal Procedures
 6. Section 01420 – References
 7. Section 01770 – Closeout Procedures
- B. ADD the following paragraph to Section 00700 – General Conditions (DPR 483)
- 1.04 Insurance, A. Insurance Requirements, (2) Builder's Risk/Installation Floater:

Builders Risk Insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, windstorm, false work, testing and startup, temporary buildings, and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

ADD the following paragraph to Section 0070 – General Conditions (DPR 483), 1.04 Insurance, (5) POLLUTION LIABILITY:

Contractor shall maintain in force, at its own expense, Pollution Liability / Environmental Liability Insurance (covers areas of: asbestos / lead abatement, demolition, electrical, excavation / grading, plumbing, masonry, painting, roofing, DOD & DOE, transformer / PCBs, general contracting, environmental remediation, drilling, emergency response, industrial cleaning / maintenance,

lab packing, mechanical, paving, Superfund, storage tank and utility, mold remediation and incidental fungus), with limits not less than one million dollars (\$1,000,000) depending on exposure.

- C. All testing referred to in the Contract Documents shall be made by an independent testing lab arranged and paid for by the Contractor and approved by the State's Representative.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION (not used)

END OF SECTION 00802

SECTION 00804
DISPOSAL OF REFUSE

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Dispose of waste, debris, and rubbish resulting from the construction of the project.
- B. If excess excavation spoils cannot be suitably disposed of on State property, as directed by the State's Representative, it shall be hauled away at the Contractor's expense.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

3.1 REQUIREMENTS

- A. Remove waste materials, debris, and rubbish from site and legally dispose of at public or private dumping areas off State property.
- B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - 1. Do not burn or bury rubbish and waste materials on project site.
 - 2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
 - 3. Do not dispose of wastes into streams or waterways

END OF SECTION 00804

SECTION 00810

CONSTRAINTS AND MITIGATIONS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. The following requirements supplement the General Conditions, Section 00700.

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION

3.1 CONSTRAINTS AND MITIGATIONS

- A. The Department of Parks and Recreation has completed an environmental review process governed by the various rules, regulations, and codes of the State of California. In compliance with the environmental review document, the Contractor's operations are subject to the following constraints and environmental protection measures. In addition to these, the Contractor is also responsible for compliance with any and all constraints or environmental protection measures that may be noted in other sections of the Technical Specifications.
- B. The contractor's operations are subject to the following constraints and mitigations:
 - 1. Under the CEQA process the project received Categorical Exemption: Class 2, Section 1530. There are no apparent environmental constraints and mitigations.

3.2 SITE CONDITIONS

- A. Coordination with State's Representative
 - 1. Contact State's Representative at least five (5) days in advance of planned ground disturbance work. State's Representative will in turn notify Archaeologist/Cultural/Natural Resource Specialist when such work is planned.

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Constraints and Mitigations

2. Contractor shall coordinate directly with State's Representative regarding archaeological/cultural/natural specialist monitoring. Any directives from the Archaeologist/Cultural/Natural specialist in relation to need for interruption of specific contractor work will be made through the State's Representative.

B. Limit of Work

1. Contractor shall layout all planned[removal, demolition or ground disturbance work for review and approval prior to such work commencing.
2. Contractor shall avoid all removal, demolition, ground disturbance, and any other destructive activities that may disturb historic fabric, artifacts, archaeological, cultural or natural resources until State's Representative gives approval to proceed.

C. Role of Archaeologist/Cultural/Natural Specialist

1. Prior to construction state date, but during the submittal period, archaeologist/cultural/natural specialist(s) will attempt to mark or identify, where certain historical fabric/cultural resources are to be documented, salvaged, or left in (situ) place at the project site. This by no means is meant to indicate that during the course of demolition, ground disturbance, or destructive activities, that the contractor is free to move forward without first obtaining permission to proceed from the State's Representative, or that during the course of such actions, new **or previously unknown** areas will not be marked or identified by the archaeologist/cultural specialist.
2. During construction, archaeologist/cultural/natural specialist will monitor all demolition, ground disturbance, or destructive activities.
3. Archaeologist/cultural/natural specialist will determine whether appropriate treatments such as handwork, will be necessary for certain demolition, ground disturbance, or destructive activities. Directives in relation to need for alteration of technique or interruption of specific contractor work will be given by State's Representative.

D. Down Time

1. If unforeseen cultural/natural resources are uncovered during execution of the work, the State Representative will put work on hold at that specific location, and Contractor(s) will be redirected to other tasks. The archaeologist/cultural/natural specialist will record and evaluate the find and implement avoidance, preservation, or recovery

measures as appropriate compliance with environmental law and department resource directives prior to State's Representative directing resumption of work at that specific location.

2. Contractor shall include in the project schedule, consideration of up 5 calendar days down time for unforeseen conditions uncovered during execution of work that may require further resource analysis. Down time days must be approved by the State's Representative.

3.3 PROTECTION OF EXISTING RESOURCES

- A. Provide required protection, in areas identified on drawings, or as directed by State's Representative to maintain integrity of the resources to be protected during the course of the project.

END OF SECTION 00810

SECTION 01100 SUMMARY OF WORK

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Information:

1. Owner: State of California, Department of Parks and Recreation.
2. Park District: Hollister Hills
3. Park Unit: Hollister Hills State Vehicle Recreation Area
4. Location: San Benito County, near City of Hollister

B. Refer to Notice to Contractors included in Project Manual for a general description of the work.

1.2 WORK PHASING AND SEQUENCE

A. The Work shall be conducted in 2 phases.

1. Phase 1: The 1200 square feet Addition and remodel at the new RANGER RESOURCES OFFICE building shall be fully complete, systems fully operational and ready for occupancy before beginning Phase 2, Remodel work on the new ADMINISTRATIVE OFFICE building.
2. Phase 2: The new ADMINISTRATIVE OFFICE building remodel shall be completely vacated of furnishings and unoccupied for the contractor to conduct work after completion of the addition and remodel to the RANGER RESOURCES OFFICE building.

1.3 USE OF PROJECT SITE

A. General: The project site is limited to the areas indicated, and the Contractor shall limit operations to the project site. Contractor shall have full use of project site for construction operations during construction period. Contractor's use of project site is limited only by The State's right to perform work or to retain other contractors on portions of Project or as directed by State's Representative. Rules and regulations for state park systems are found in Title 14 California Code of Regulations, Division 3, Chapters 1 and 2.

1.4 WORK UNDER OTHER CONTRACTS

A. Separate Contract: The reserves the right to award a separate contract for performance of certain construction operations at Project site. Those operations may be scheduled in conjunction to this contract and shall be complete before work under this Contract begins.

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Summary of Work

- B. Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.

1.5 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format and CSI/CSC's "MasterFormat" numbering system.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01100

SECTION 01140 WORK RESTRICTIONS

PART 1 - GENERAL

- 1.1 **USE OF PROJECT SITE** Use of Site: Limit operations to work in areas indicated. Do not disturb portions of project site beyond areas indicated.

1. Limits: Confine constructions operations to the areas indicated.
2. State Occupancy: Allow for State occupancy of site and use by the public.
3. Driveways and Entrances: Keep driveways and entrances serving the project site clear and available to The State, State's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

- a. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

- B. Use of Existing Facilities: Maintain existing facilities in a weather tight condition throughout construction period. Repair damage caused by construction operations. Protect facilities and occupants during construction period.

1.2 SPECIAL REQUIREMENTS

- A. The 1200 square feet Addition at the new RANGER RESOURCES OFFICE building shall be fully complete, systems fully operational and ready for occupancy before beginning remodel work on the ADMINISTRATIVE OFFICE building.

1.3 OCCUPANCY REQUIREMENTS

- A. The new RANGER RESOURCES OFFICE building shall be completely vacated of furnishings and unoccupied for the contractor to conduct work.
 - B. The new ADMINISTRATIVE building shall be completely vacated of furnishings and unoccupied for the contractor to conduct work after completion of the RANGER RESOURCES OFFICE building.
 - C. Partial Owner Occupancy: State reserves the right to occupy and to place and install equipment in completed areas of the facility, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total Work.
 1. State Representative will prepare a Certificate of Substantial Completion for each specific portion of the Work to be occupied before State occupancy.

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Work Restrictions

2. Mechanical, electrical and other systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, State will provide, operate, and maintain systems serving occupied portions of the facility.
3. On occupancy, State will assume responsibility for maintenance and custodial service for occupied portions of the facility.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01140

SECTION 01250 CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications. The terms "Change Order", "Contract Modification", and "Amendment" are synonymous.

1.2 MINOR CHANGES IN THE WORK

- A. State Representative will issue Bulletins, defined as supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.3 PROPOSED CHANGE ORDER (PCO)

- A. State-Initiated Requests: State Representative will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. PCOs issued by State Representative are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within 15 days after receipt of a PCO, submit a change proposal indicating all cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity durations, start and finish times, and activity relationships. Use available total float before requesting an extension of the Contract Time.
- B. Contractor - Change Order Request (COR) - : Contractor may propose changes by submitting a Change Order Request (COR).
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed

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Contract Modification Procedures

change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.

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

1.4 ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, base each Change Order proposal on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
 3. Submit substantiation of a change in scope of work, if any, claimed in Change Order proposals related to unit-cost allowances.
 4. State reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit requests for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the Purchase Order amount or Contractor's handling, labor, installation, overhead, and profit. Submit request within 10 days of receipt of the Contract Field Order (CFO) authorizing work to proceed on the allowance. The State has the option to reject requests submitted later than 10 days after such authorization.
 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order proposal cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

1.5 CONTRACT FIELD ORDER (CFO)

- A. Contract Field Order: The State may issue a Contract Field Order (CFO). A CFO instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Contract Amendment.
 - 1. A CFO contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

1.6 CHANGE ORDER (CONTRACT AMENDMENT)

- A. Submit a letter of authority indicating the Contractor's authorized representative for negotiation of cost and time adjustments, and the limits of their authority. On State's approval of a Contractor's Change Proposal, State will issue a Contract Amendment for signatures of State and Contractor.

PART 2 - PART2 – PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01250

SECTION 01290 PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 SCHEDULE OF VALUES

- A. General: Submit Schedule of Values in accordance with GENERAL CONDITIONS.
- B. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with the project CPM Schedule.
 - 2. Subschedules: Where the Work is separated into phases requiring separately phased payments, provide sub-schedules showing values correlated with each phase of payment.
- C. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
 - 1. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
 - 2. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 - 3. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - 4. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 - 5. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
 - 6. Each item in the Schedule of Values and Applications for Payment shall be complete..

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- a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
7. Provide separate line items for profit, fees, taxes, overhead, and General Conditions.
8. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Contract Field Orders result in a change in the Contract Sum.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be sequentially numbered and consistent with previous applications and payments as certified by the State Representative and paid for by the State.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Transmittal: Submit three (3) signed original copies of each Application for Payment to the State.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- C. Administrative Items: Administrative actions, submittals , and update submittals that must precede or coincide with submittal of first Application for Payment include the following:
 1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Construction Schedule (preliminary if not final).
 4. Submittals Schedule (preliminary if not final).
 5. List of Contractor's staff assignments.
 6. Copies of required permits.
 7. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
- D. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.

2. This application shall reflect Certificates of Partial Substantial Completion issued previously for State occupancy of designated portions of the Work.
- E. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. Project Record Documents (As-Builts).
 5. Operation and Maintenance (O & M) Manuals.
 6. Warranties.
 7. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when the State took possession of and assumed responsibility for corresponding elements of the Work.

END OF SECTION 01290

SECTION 01310
PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
1. General Project coordination procedures.
 2. Coordination Drawings.
 3. Project meetings.

1.2 COORDINATION

- A. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for the State and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule.
 2. Preparation of the Schedule of Values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.

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6. Preinstallation conferences.
7. Project closeout activities.

1.3 SUBMITTALS

- A. Coordination Drawings: Prepare Coordination Drawings where specified and where coordination is required for installation of products and materials fabricated by separate entities.
 1. Indicate relationship of components shown on separate Shop Drawings.
 2. Indicate required installation sequences.
 3. See Division 15 Section 15050 "Basic Mechanical Materials and Methods" for specific Coordination Drawing requirements for mechanical installations.
 4. See Division 16 Section 16050 "Basic Electrical Materials and Methods" for specific Coordination Drawing requirements for electrical installations.

1.4 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.
 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify the State's Representative of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including the State, within 3 days of the meeting.
- B. Preconstruction Conference: a preconstruction conference will be scheduled by the State's Representative before starting construction, the conference will be held at the Project site or another convenient location. The meeting will review responsibilities and personnel assignments.
 1. Attendees: Authorized representatives of the State, and its consultants; Contractor and its superintendent; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing and sequencing.
 - c. Special work restrictions.
 - d. Designation of responsible personnel.

- e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for processing Applications for Payment.
 - g. Distribution of the Contract Documents.
 - h. Submittal procedures.
 - i. Preparation of Record Documents.
 - j. Use of facilities.
 - k. Responsibility for temporary facilities and controls.
 - l. Parking availability.
 - m. Office, work, and storage areas.
 - n. Equipment deliveries and priorities.
 - o. First aid.
 - p. Security.
 - q. Progress cleaning.
 - r. Working hours.
 - s. Inspection and Quality Control.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
- 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the State's Representative of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related Change Orders.
 - d. Purchases.
 - e. Deliveries.
 - f. Submittals.
 - g. Review of mockups.
 - h. Possible conflicts.
 - i. Compatibility problems.
 - j. Time schedules.
 - k. Weather limitations.
 - l. Manufacturer's written recommendations.
 - m. Warranty requirements.
 - n. Compatibility of materials.
 - o. Acceptability of substrates.
 - p. Temporary facilities and controls.
 - q. Space and access limitations.
 - r. Regulations of authorities having jurisdiction.

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Project Management and Coordination

- s. Testing and inspecting requirements.
 - t. Required performance results.
 - u. Protection of construction and personnel.
 - 3. Record significant conference discussions, agreements, and disagreements.
 - 4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at intervals as determined by the State's Representative. Coordinate dates of meetings with preparation of payment requests.
- 1. Attendees: In addition to representatives of the State, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.

- 12) Quality and work standards.
 - 13) Change Orders.
 - 14) Documentation of information for payment requests.
3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
- a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01310

SECTION 01320
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
1. Contractor's Construction Schedule.
 2. Submittals Schedule.
 3. Daily construction reports.
 4. Field condition reports.
 5. Construction photographs.

1.2 DEFINITIONS

- A. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- B. Float: The measure of leeway in starting and completing an activity.
1. Float time belongs to the State and is not for the exclusive use or benefit of either the State or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
- C. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- D. Major Area: A story of construction, a separate building, or a similar significant construction element.

1.3 SUBMITTALS

- A. Submittals Schedule: Submit three (3) copies of schedule. Arrange the following information in a tabular format:
1. Scheduled date for first submittal.
 2. Specification Section number and title.
 3. Submittal category (action or informational).
 4. Name of subcontractor.
 5. Description of the Work covered.
 6. Scheduled date for State's final release or approval.

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Construction Progress

- B. Preliminary Network Diagram: Submit three (3) printed copies, one a single sheet of reproducible media and one a print, large enough to show entire network for entire construction period.
- C. Contractor's Construction Schedule: Submit three printed copies of initial schedule, one a reproducible print and one a blue- or black-line print, large enough to show entire schedule for entire construction period.
- D. CPM Reports: Concurrent with CPM schedule, submit three (3) printed copies of each of the following computer-generated reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float.
 - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
 - 3. Total Float Report: List of all activities sorted in ascending order of total float.
- E. Construction Photographs: Submit digital photographs to the State Representative within seven days of taking the photograph.
- F. Daily Construction Reports: Submit three (3) copies daily.
- G. Field Condition Reports: Submit three (3) copies at time of discovery of differing conditions.

1.4 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.
- C. Auxiliary Services: Cooperate with the State's Representative and provide auxiliary services requested, including access to Project site and use of temporary facilities including temporary lighting.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 - 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 - 2. Submit concurrently with the first complete submittal of Contractor's Construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for commencement of the Work to date of Final Completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by the State's Representative.
 - 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section 01330 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 - 4. Startup and Testing Time: Include not less than three (3) days for startup and Testing.
 - 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for State's Representative administrative procedures necessary for certification of Substantial Completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

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Construction Progress

1. Phasing: Arrange list of activities on schedule by phase.
 2. Work under More Than One Contract: Include a separate activity for each contract.
 3. Work by the State: Include a separate activity for each portion of the Work performed by the State.
 4. Work Restrictions: Show the effect on the schedule of the following:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Use of premises restrictions.
 - e. Provisions for future construction.
 - f. Seasonal variations.
 - g. Environmental control.
 5. Work Stages: Indicate important stages of construction for each major portion of the Work.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and Final Completion.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording events at Project site, including the following:
1. List of subcontractors.
 2. High and low temperatures and general weather conditions.
 3. Accidents.
 4. Stoppages, delays, shortages, and losses.
 5. Meter readings and similar recordings.
 6. Orders and requests of authorities having jurisdiction.
 7. Services connected and disconnected.
 8. Equipment or system tests and startups.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information, include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate Actual Completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to the State's Representative, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01320

SECTION 01330 SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires the Designer's responsive action.
- B. Informational Submittals: Written information that does not require the Designer's approval. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. The State Representative reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- B. Submittals Schedule: Six copies of each submittal must be transmitted to the State Representative within 15 days of Notice To Proceed.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on the Designer's receipt of submittal.
 - 1. Initial Review: Allow 20 working days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The State will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. If intermediate submittal is necessary, process it in same manner as initial submittal.
 - 3. Allow 15 working days for processing each resubmittal.

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Submittal Procedures

4. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing.
- D. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space on label or beside title block to record Contractor's review and approval markings and action taken by the State.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Contractor.
 - d. Name and address of subcontractor.
 - e. Name and address of supplier.
 - f. Name of manufacturer.
 - g. Unique sequential identifier, including revision number.
 - h. Number and title of appropriate Specification Section.
 - i. Drawing number and detail references, as appropriate.
 - j. Other necessary identification.
- E. Deviations: Highlight, encircle, or otherwise identify in a manner acceptable to the State any deviations from the Contract Documents on submittals.
- F. Additional Copies: Unless additional copies are required for final submittal, and unless the Designer observes noncompliance with provisions of the Contract Documents, initial submittal may serve as final submittal.
1. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.
- G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Number each submittal sequentially and date each submittal. The State Representative will return submittals, without review, from sources other than Contractor.
1. Include Contractor's certification stating that information submitted complies with requirements of the Contract Documents.
 2. Transmittal Form: Use form approved by the State Representative.
- H. Use for Construction: Use only final submittals with mark indicating action taken by the State in connection with construction.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
 - 1. Number of Copies: Submit six copies of each submittal, unless otherwise indicated. The State Representative will return two copies. Mark up and retain one returned copy as a Project Record Document.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Manufacturer's catalog cuts.
 - e. Wiring diagrams showing factory-installed wiring.
 - f. Printed performance curves.
 - g. Operational range diagrams.
 - h. Compliance with recognized trade association standards.
 - i. Compliance with recognized testing agency standards.
- C. Shop Drawings: Submit Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Notation of coordination requirements.
 - j. Notation of dimensions established by field measurement.

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Submittal Procedures

2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least **8-1/2 by 11 inches** but no larger than **30 by 40 inches**.
- D. Samples: Submit physical units of materials or products, including the following:
1. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Submit three full set[s] of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. The State Representative will return submittal with options selected.
 2. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Submit three (3) sets of Samples. The State will retain **two** Sample sets; remainder will be returned.
 3. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Submit Samples to match the State's sample where so indicated. Attach label on unexposed side.
 4. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
 5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
- E. Product Schedule or List: Submit a written summary indicating types of products required for the Work and their intended location.
- F. Application for Payment: Comply with requirements in Division 1 Section 01290 "Payment Procedures."

- G. Schedule of Values: Comply with requirements in Section 00700 General Conditions.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 - 1. Number of Copies: Submit six (6) copies of each submittal, unless otherwise indicated. The State Representative will return two (2) copies.
 - 2. Certificates and Certifications: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
- B. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements.
- C. Welding Certificates: Submit written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- D. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, is authorized for this specific Project.
- E. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
- F. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements.
- G. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- H. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- I. Field Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.

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Submittal Procedures

- J. Product Test Reports: Submit written reports indicating current product produced by manufacturer complies with requirements. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- K. Research/Evaluation Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
- L. Maintenance Data: Submit written and graphic instructions and procedures for operation and normal maintenance of products and equipment.
- M. Design Data: Submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- N. Manufacturer's Instructions: Submit written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.
- O. Manufacturer's Field Reports: Submit written information documenting factory-authorized service representative's tests and inspections.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to the State.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 DESIGNER'S ACTION

- A. General: The Designer will not review submittals that do not bear Contractor's approval stamp and will return them without action.

- B. Action Submittals: The Designer will review each submittal, make marks to indicate corrections or modifications required, and return it. The Designer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken:
- C. Informational Submittals: The Designer will review each submittal and will return it, or will reject and return it if it does not comply with requirements. The State Representative will forward each submittal to appropriate party.

END OF SECTION 01330

SECTION 01400 QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Contractor shall arrange and pay for a State approved Testing Agency to perform all required testing for the project.
- C. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specified tests, inspections, and related actions do not limit Contractor's quality-control efforts as necessary to provide compliance with the Contract Document requirements.
 - 2. Requirements for Contractor to provide quality-control services required by the Designer, the State, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions before, during and after execution of the Work to evaluate that completed construction complies with requirements. Quality Control Services do not include contract enforcement activities performed by the State or Designer of Record.
- C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.3 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to the State Representative.

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Quality Requirements

1.4 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.
- C. Contractor's Daily Quality Control Reports: The Contractor shall designate an individual responsible for maintaining control over the quality of the work. For each day on which work is scheduled to be performed, the Contractor's Quality Control Representative shall Prepare and submit certified written reports that include the following:
 - 1. Date of report preparation and date work was performed.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples, tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work performed that day, and reasons for non-work.
 - 7. Item of work tested or inspected. Test and inspection methods.
 - 8. Identification of products delivered/installed and corresponding Specification Sections.
 - 9. Complete test or inspection data.
 - 10. Test and inspection results and an interpretation of test results.
 - 11. Weather conditions. Ambient conditions at time of sample taking , testing and inspecting.
 - 12. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 13. Name and signature of Quality Control Representative, and laboratory inspector.
 - 14. Recommendations on retesting and reinspecting.
- D. Permits, Licenses, and Certificates: For the State's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 548, and that specializes in types of tests and inspections to be performed.

1.6 QUALITY CONTROL

- A. State Responsibilities: Where testing services are indicated as The State's responsibility, the State will engage a qualified testing agency to perform these services.
 - 1. The State will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
 - 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
 - 3. The presence or absence of the State's inspector or testing agency does not relieve the Contractor of sole responsibility for compliance with the Contract Documents.
- B. Contractor Responsibilities: The Contractor is solely responsible for controlling the work to comply with the Contract Documents. Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.

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Quality Requirements

1. Where testing or inspection services are not indicated as the State's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ the same entity engaged by The State, unless agreed to in writing by The State.
 2. Notify the State Representative, State's testing agencies, Inspector of Record, and Contractor's testing agencies at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where testing or inspection services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each testing or inspection service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Special Tests and Inspections: The Contractor will engage a testing agency to conduct special tests and inspections required by authorities having jurisdiction
1. Testing agency will notify the State Representative and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 2. Testing agency will submit a certified written report of each test, inspection, and similar quality-control service to the State Representative with copy to Contractor and to authorities having jurisdiction.
 3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 5. Testing agency will retest and reinspect corrected work.
- D. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.
- E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with the State Representative and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify the State and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.

2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
 5. Do not perform any duties of Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field-curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

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Quality Requirements

END OF SECTION 01400

SECTION 01420 REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": Approved by the State.
- C. "Directed": A command or instruction by the State Representative. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Installer": Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- J. "Experienced": When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

References

- K. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.
- L. "Submit": Deliver information in the specified format to the State for the State's review and approval.

1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. Conflicting Requirements: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to the State for a decision before proceeding.
 - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to the State for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source and make them available on request.
- E. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list:

ADAAG Americans with Disabilities Act (ADA)

CFR Code of Federal Regulations

CRD	Handbook for Concrete and Cement
DOD	Department of Defense Specifications and Standards
FED-STD	Federal Standard (See FS)
FS	Federal Specification
FTMS	Federal Test Method Standard (See FS)
MILSPEC	Military Specification and Standards
UFAS	Uniform Federal Accessibility Standards

1.3 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list:

AA	Aluminum Association, Inc. (The)
AAADM	American Association of Automatic Door Manufacturers
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AAN	American Association of Nurserymen (See ANLA)
AASHTO	American Association of State Highway and Transportation Officials
AATCC	American Association of Textile Chemists and Colorists (The)
ABMA	American Bearing Manufacturers Association
ACI	American Concrete Institute/ACI International
ACPA	American Concrete Pipe Association
ADC	Air Diffusion Council
AEIC	Association of Edison Illuminating Companies, Inc. (The)

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References

AFPA	American Forest & Paper Association (See AF&PA)
AF&PA	American Forest & Paper Association
AGA	American Gas Association
AGC	Associated General Contractors of America (The)
AHA	American Hardboard Association
AHAM	Association of Home Appliance Manufacturers
AI	Asphalt Institute
AIA	American Institute of Architects (The)
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALA	American Laminators Association (See LMA)
ALCA	Associated Landscape Contractors of America
ALSC	American Lumber Standard Committee
AMCA	Air Movement and Control Association International, Inc.
ANLA	American Nursery & Landscape Association (Formerly: AAN - American Association of Nurserymen)
ANSI	American National Standards Institute
AOSA	Association of Official Seed Analysts
APA	APA - The Engineered Wood Association
APA	Architectural Precast Association
API	American Petroleum Institute
ARI	Air-Conditioning & Refrigeration Institute
ASCA	Architectural Spray Coaters Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers

ASME	ASME International (The American Society of Mechanical Engineers International)
ASSE	American Society of Sanitary Engineering
ASTM	American Society for Testing and Materials
AWCI	AWCI International (Association of the Wall and Ceiling Industries International)
AWCMA	American Window Covering Manufacturers Association (See WCMA)
AWI	Architectural Woodwork Institute
AWPA	American Wood-Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Industry Association (The)
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association International)
CCC	Carpet Cushion Council
CCFSS	Center for Cold-Formed Steel Structures
CDA	Copper Development Association Inc.
CEA	Canadian Electricity Association
CFFA	Chemical Fabrics & Film Association, Inc.
CGA	Compressed Gas Association
CGSB	Canadian General Standards Board
CIMA	Cellulose Insulation Manufacturers Association
CISCA	Ceilings & Interior Systems Construction Association
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers Institute
CPA	Composite Panel Association

References

	(Formerly: National Particleboard Association)
CPPA	Corrugated Polyethylene Pipe Association
CRI	Carpet & Rug Institute (The)
CRSI	Concrete Reinforcing Steel Institute
CSA	CSA International (Formerly: IAS - International Approval Services)
CSI	Construction Specifications Institute (The)
CSSB	Cedar Shake & Shingle Bureau
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute)
DHI	Door and Hardware Institute
EIA/TIA	Electronic Industries Alliance/Telecommunications Industry Association
EIMA	EIFS Industry Members Association
EJMA	Expansion Joint Manufacturers Association, Inc.
FCI	Fluid Controls Institute
FGMA	Flat Glass Marketing Association (See GANA)
FM	Factory Mutual System (See FMG)
FMG	FM Global (Formerly: FM - Factory Mutual System)
GA	Gypsum Association
GANA	Glass Association of North America (Formerly: FGMA - Flat Glass Marketing Association)
GRI	Geosynthetic Research Institute
GTA	Glass Tempering Division of Glass Association of North America (See GANA)
HI	Hydraulic Institute
HI	Hydronics Institute
HMMA	Hollow Metal Manufacturers Association (See NAAMM)
HPVA	Hardwood Plywood & Veneer Association

HPW	H. P. White Laboratory, Inc.
IAS	International Approval Services (See CSA International)
ICEA	Insulated Cable Engineers Association, Inc.
ICRI	International Concrete Repair Institute (The)
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The)
IESNA	Illuminating Engineering Society of North America
IGCC	Insulating Glass Certification Council
ILI	Indiana Limestone Institute of America, Inc.
IRI	Industrial Risk Insurers
ITS	Intertek Testing Services
IWS	Insect Screening Weavers Association (Now defunct)
KCMA	Kitchen Cabinet Manufacturers Association
LGSI	Light Gage Structural Institute
LMA	Laminating Materials Association (Formerly: ALA - American Laminators Association)
LPI	Lightning Protection Institute
LSGA	Laminated Safety Glass Association (See GANA)
MBMA	Metal Building Manufacturers Association
MCA	Metal Construction Association
MFMA	Maple Flooring Manufacturers Association
MFMA	Metal Framing Manufacturers Association
MGPHO	Medical Gas Professional Healthcare Organization, Inc.
MHIA	Material Handling Industry of America
MIA	Marble Institute of America
ML/SFA	Metal Lath/Steel Framing Association (See SSMA)

References

MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc.
NAAMM	National Association of Architectural Metal Manufacturers
NAAMM	North American Association of Mirror Manufacturers (See GANA)
NACE	NACE International (National Association of Corrosion Engineers International)
NAIMA	North American Insulation Manufacturers Association (The)
NAMI	National Accreditation and Management Institute, Inc.
NAPM	National Association of Photographic Manufacturers (See PIMA)
NBGQA	National Building Granite Quarries Association, Inc.
NCMA	National Concrete Masonry Association
NCPI	National Clay Pipe Institute
NCTA	National Cable Television Association
NEBB	National Environmental Balancing Bureau
NECA	National Electrical Contractors Association
NeLMA	Northeastern Lumber Manufacturers' Association
NEMA	National Electrical Manufacturers Association
NETA	InterNational Electrical Testing Association
NFPA	National Fire Protection Association
NFRC	National Fenestration Rating Council
NGA	National Glass Association
NHLA	National Hardwood Lumber Association
NLGA	National Lumber Grades Authority
NOFMA	National Oak Flooring Manufacturers Association
NPA	National Particleboard Association (See CPA)
NRCA	National Roofing Contractors Association
NRMCA	National Ready Mixed Concrete Association

NSA	National Stone Association
NSF	NSF International (National Sanitation Foundation International)
NTMA	National Terrazzo and Mosaic Association, Inc.
NWWDA	National Wood Window and Door Association (See WDMA)
PCI	Precast/Prestressed Concrete Institute
PDCA	Painting and Decorating Contractors of America
PDI	Plumbing & Drainage Institute
PGI	PVC Geomembrane Institute
PIMA	Photographic & Imaging Manufacturers Association (Formerly: NAPM - National Association of Photographic Manufacturers)
RCSC	Research Council on Structural Connections
RFCI	Resilient Floor Covering Institute
RIS	Redwood Inspection Service
RMA	Rubber Manufacturers Association
SAE	SAE International
SDI	Steel Deck Institute
SDI	Steel Door Institute
SEFA	Scientific Equipment and Furniture Association
SGCC	Safety Glazing Certification Council
SIGMA	Sealed Insulating Glass Manufacturers Association
SJI	Steel Joist Institute
SMA	Screen Manufacturers Association
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division)

References

SPI	The Society of the Plastics Industry
SPIB	Southern Pine Inspection Bureau (The)
SPI/SPFD	The Society of the Plastics Industry Spray Polyurethane Foam Division (See SPFA)
SPRI	SPRI (Single Ply Roofing Institute)
SSINA	Specialty Steel Industry of North America
SSMA	Steel Stud Manufacturers Association (Formerly: ML/SFA - Metal Lath/Steel Framing Association)
SSPC	SSPC: The Society for Protective Coatings
STI	Steel Tank Institute
SWI	Steel Window Institute
SWRI	Sealant, Waterproofing, and Restoration Institute
TCA	Tile Council of America, Inc.
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance
TPI	Truss Plate Institute
TPI	Turfgrass Producers International
UFAC	Upholstered Furniture Action Council
UL	Underwriters Laboratories Inc.
UNI	Uni-Bell PVC Pipe Association
USITT	United States Institute for Theatre Technology, Inc.
USP	U.S. Pharmacopeia
WASTEC	Waste Equipment Technology Association
WCLIB	West Coast Lumber Inspection Bureau
WCMA	Window Covering Manufacturers Association (Formerly: AWCMA - American Window Covering Manufacturers Association)
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA - National Wood Window and Door Association)
WIC	Woodwork Institute of California

WMMPA Wood Moulding & Millwork Producers Association

WWPA Western Wood Products Association

- C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list:

ICC International Code Council
(Formerly: CABO - Council of American Building Officials)

- D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list:

CE Army Corps of Engineers

CPSC Consumer Product Safety Commission

DOC Department of Commerce

EPA Environmental Protection Agency

FAA Federal Aviation Administration

FCC Federal Communications Commission

FDA Food and Drug Administration

GSA General Services Administration

HUD Department of Housing and Urban Development

LBL Lawrence Berkeley Laboratory (See LBNL)

LBNL Lawrence Berkeley National Laboratory

NCHRP National Cooperative Highway Research Program (See TRB)

References

NIST	National Institute of Standards and Technology
OSHA	Occupational Safety & Health Administration
RUS	Rural Utilities Service (See USDA)
TRB	Transportation Research Board
USDA	Department of Agriculture
USPS	Postal Service

- E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list:

CALTRANS	State of California, Department of Transportation
CAPUC	(See CPUC)
CBHF	State of California, Department of Consumer Affairs Bureau of Home Furnishings and Thermal Insulation
CPUC	California Public Utilities Commission
DGS	State of California, Department of General Services
DPR	State of California, Department of Parks and Recreation
TFS	Texas Forest Service Forest Products Laboratory

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01420

SECTION 01500
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.
- B. Contractor may elect to provide a temporary construction office and utilities. The following requirements apply if these facilities are to be provided.
- C. Site is subject to continual public use. Facilities shall be safe and secure at all times.

1.2 DEFINITIONS

- A. Permanent Enclosure: As determined by the State, permanent or temporary roofing is complete, insulated, and weather tight; exterior walls are insulated and weather tight; and all openings are closed with permanent construction or substantial temporary closures.

1.3 TEMPORARY UTILITIES

- A. General: Cost or use charges for temporary facilities are not chargeable to the State and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, [the State's Representative, occupants of Project, testing and inspecting agencies, and personnel of authorities having jurisdiction.
- B. Water Service: Use water from the State's existing water system without metering and without payment of use charges. Contractor shall provide water supply.
- C. Electric Power Service: The Contractor shall provide their own temporary electrical power. The State's electrical power may be available for the contractor's use if written permission is granted by the State.

1.4 SUBMITTALS

- A. Temporary Utility Reports: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

1.5 QUALITY ASSURANCE

Temporary Facilities and Controls

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
 - 1. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70 and CEC.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

- A. Temporary Utilities: At earliest feasible time, when acceptable to the State, change over from use of temporary service to use of permanent service.
 - 1. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before the State's acceptance, regardless of previously assigned responsibilities.
- B. Conditions of Use: The following conditions apply to use of temporary services and facilities by all parties engaged in the Work:
 - 1. Keep temporary services and facilities clean and neat.
 - 2. Relocate temporary services and facilities as required by progress of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved. Provide materials suitable for use intended.
- B. Portable Chain-Link Fencing: Minimum 2-inch (50-mm) 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete or galvanized steel bases for supporting posts as directed.
- C. Temporary Plastic Fencing: Plastic mesh fence shall be Orange, 48-inches high minimum. Install line posts at 72-inches on center with accessories as required for a complete temporary fence system.

- D. Wood Enclosure Fence: Plywood, **6 feet (1.8 m)** high, framed with four 2-by-4-inch (50-by-100-mm) rails, with preservative-treated wood posts spaced not more than 8 feet (2.4 m) apart.
- E. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.
- F. Water: Potable.

2.2 EQUIPMENT

- A. Field Offices: Mobile units with lockable entrances, operable windows, and serviceable finishes; heated and air conditioned; on foundations adequate for normal loading.
- B. Fire Extinguishers: Hand carried, portable, UL rated. Provide class and extinguishing agent as indicated or a combination of extinguishers of NFPA-recommended classes for exposures.
 - 1. Comply with Title 19 CCR, Division 1, Chapter 3; and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- C. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- D. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water, drinking-water units, including paper cup supply.
 - 1. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F (7.2 to 12.7 deg C).
- E. Heating Equipment: Unless the State authorizes use of permanent heating system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use for type of fuel being consumed.
- F. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.

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Temporary Facilities and Controls

- G. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
 - 1. Arrange with utility company, the State, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services. Provide minimum 48 hours advance written notice.
 - 2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
 - 3. Obtain easements to bring temporary utilities to Project site where the State's easements cannot be used for that purpose.
- B. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.
- C. Water Service: Use of the State's existing water service facilities may be permitted, at the direction of the State Representative, as long as facilities are cleaned and maintained in a condition acceptable to the State. At Substantial Completion, restore these facilities to condition existing before initial use.
 - 1. Provide rubber hoses as necessary to serve Project site.
 - 2. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.

- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
 2. Toilets: Use of the State's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to the State. At Substantial Completion, restore these facilities to condition existing before initial use.
 3. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Provide separate facilities for male and female personnel.
 4. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel who handle materials that require wash up. Dispose of drainage properly. Supply cleaning compounds appropriate for each type of material handled.
 5. Drinking-Water Facilities: Provide bottled-water, drinking-water units.
 - a. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 deg F (7.2 to 12.7 deg C).
- E. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed.
1. Maintain a minimum temperature of 50 deg F (10 deg C) in permanently enclosed portions of building for normal construction activities, and 65 deg F (18.3 deg C) for finishing activities and areas where finished Work has been installed.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- G. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.

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Temporary Facilities and Controls

1. Install electric power service underground, unless overhead service must be used.
 2. Install power distribution wiring overhead and rise vertically where least exposed to damage.
- H. Electric Power Service: Use of the State's existing electric power service may be permitted, at the direction of the State Representative, as long as equipment is maintained in a condition acceptable to the State.
- I. Electric Distribution: Provide receptacle outlets adequate for connection of power tools and equipment.
1. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- J. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations and traffic conditions.
1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
 2. Provide one 100-W incandescent lamp per 500 sq. ft. (45 sq. m), uniformly distributed, for general lighting, or equivalent illumination.
 3. Provide one 100-W incandescent lamp every 50 feet (15 m) in traffic areas.
 4. Provide one 100-W incandescent lamp per story in stairways and ladder runs, located to illuminate each landing and flight.
 5. Install exterior-yard site lighting that will provide adequate illumination for construction operations, traffic conditions, and signage visibility when the Work is being performed.
- K. Telephone Service: Provide temporary telephone service throughout construction period for common-use facilities used by all personnel engaged in construction activities. Install separate telephone line for each field office and first-aid station.
1. Provide additional telephone lines for the following:
 - a. In field office with more than two occupants, install a telephone for each additional occupant or pair of occupants.
 - b. Provide a dedicated telephone line for each facsimile machine and computer with modem in each field office.
 2. At each telephone, post a list of important telephone numbers, including police and fire departments, ambulance service, Contractor's home office, the State's office, and principal subcontractors' field and home offices.
 3. Provide a portable cellular telephone for superintendent's use in making and receiving telephone calls when away from field office.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
 2. Provide incombustible construction for offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines. Comply with NFPA 241.
 3. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the State.
- B. Dewatering Facilities and Drains: Comply with requirements in applicable Division 2 Sections for temporary drainage and dewatering facilities and operations not directly associated with construction activities included in individual Sections. Where feasible, use same facilities. Maintain Project site, excavations, and construction free of water.
- C. Project Identification and Temporary Signs: Prepare Project identification and other signs in sizes indicated or as directed. Install signs where indicated to inform public and persons seeking entrance to Project. Do not permit installation of unauthorized signs.
1. Engage an experienced sign painter to apply graphics for Project identification signs. Comply with details indicated.
 2. Prepare temporary signs to provide directional information to construction personnel and visitors.
- D. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Containerize and clearly label hazardous, dangerous, or unsanitary waste materials separately from other waste. Comply with Division 1 Section 01700 "Execution Requirements " for progress cleaning requirements.
1. If required by authorities having jurisdiction, provide separate containers, clearly labeled, for each type of waste material to be deposited.
 2. Develop a waste management plan for Work performed on Project. Indicate types of waste materials Project will produce and estimate quantities of each type. Provide detailed information for on-site waste storage and separation of recyclable materials. Provide information on destination of each type of waste material and means to be used to dispose of all waste materials.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

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Temporary Facilities and Controls

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects. Avoid using tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near Project site.
- B. Stormwater Control: Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of stormwater from heavy rains. Provide stormwater control in accordance with Contractor's approved Stormwater Pollution Prevention Plan.
- C. Tree and Plant Protection: Install temporary fencing located as indicated on drawings to protect trees from construction damage. Protect tree root systems from damage, flooding, and erosion.
- D. Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest-control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Engage this pest-control service to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for the State. Perform control operations lawfully, using environmentally safe materials.
- E. Site Enclosure Fence: Before construction operations begin install enclosure fence with lockable entrance gates. Locate where indicated, or enclose entire Project site or portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering site except by entrance gates.
 - 1. Set portable chain-link fence posts in concrete or galvanized steel bases.
 - 2. Provide gates in sizes and at locations necessary to accommodate delivery vehicles and other construction operations.
 - 3. Maintain security by limiting number of keys and restricting distribution to authorized personnel.
- F. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- G. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erecting structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Where appropriate and needed, provide lighting, including flashing red or amber lights.

- H. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather-tight enclosure for building exterior.
1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 2. Vertical Openings: Close openings of 25 sq. ft. (2.3 sq. m) or less with plywood or similar materials.
 3. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
 4. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.
- I. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
1. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.
 - a. Locate fire extinguishers where convenient and effective for their intended purpose; provide not less than one extinguisher on each floor at or near each usable stairwell.
 2. Store combustible materials in containers in fire-safe locations.
 3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for firefighting. Prohibit smoking in hazardous fire-exposure areas.
 4. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
 5. Permanent Fire Protection: At earliest feasible date in each area of Project, complete installation of permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.
 6. Develop and supervise an overall fire-prevention and first-aid fire-protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 7. Provide hoses for fire protection of sufficient length to reach construction areas. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

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Temporary Facilities and Controls

8. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.
 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Temporary Facility Changeover: Except for using permanent fire protection as soon as available, do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 1. Materials and facilities that constitute temporary facilities are the property of Contractor. The State reserves right to take possession of Project identification signs.
 2. At Substantial Completion, clean and renovate permanent facilities used during construction period.

END OF SECTION 01500

SECTION 01731 CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.

1.2 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
 - 2. Changes to Existing Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utilities: List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
 - 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - 7. The State's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.3 QUALITY ASSURANCE

- A. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
- B. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the State's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

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Cutting and Patching

1. If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm.

1.4 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections of these Specifications.
- B. Existing Materials: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

- D. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut existing construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Existing Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete or Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

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Cutting and Patching

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
4. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather tight condition.

END OF SECTION 01731

SECTION 01732 SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes demolition and removal of the following:
 - 1. Selected portions of a building or structure.
 - 2. Selected site elements.
 - 3. Repair procedures for selective demolition operations.

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: Detach items from existing construction and deliver them to the State ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain the State's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.4 SUBMITTALS

- A. Proposed Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate. Include measures for the following:
 - 1. Dust control.
 - 2. Noise control.
- B. Schedule of Selective Demolition Activities: Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each

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Selective Demolition

activity, interruption of utility services, use of elevator and stairs, and locations of temporary partitions and means of egress.

- C. Predemolition Photographs or Videotape: Document existing conditions of adjoining construction and site improvements adjacent to demolition operations. Submit photographs and/or videotapes taken in the presence of the State's Representative. Submit before Work begins.
- D. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.5 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Standards: Comply with ANSI A10.6 and NFPA 241.
- D. Predemolition Conference: Conduct conference at Project the Core area site. Review predemolition condition documentation.

1.6 PROJECT CONDITIONS

- A. The State will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so the State's operations will not be disrupted. Provide not less than 72 hours' notice to the State of activities that will affect the State's operations.
- B. Maintain safe access to existing walkways, corridors, and other adjacent occupied or used facilities.
 - 1. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.
- C. The State assumes no responsibility for condition of areas to be selectively demolished.
 - 1. Conditions existing at time of inspection for bidding purpose will be maintained by the State as far as practical.
- D. Storage or sale of removed items or materials on-site will not be permitted.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

- A. Use repair materials identical to existing materials.
 1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
 2. Use materials whose installed performance equals or surpasses that of existing materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. 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 submit a written report to the State.
- E. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

3.2 UTILITY SERVICES

- A. Existing Utilities: Maintain services indicated to remain and protect them against damage during selective demolition operations.
- B. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by the State and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to the State and to authorities having jurisdiction.
 1. Provide at least 48 hours' written notice to the State if shutdown of service is required during changeover.

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- C. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be selectively demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
 - 2. If utility services are required to be removed, relocated, or abandoned, provide temporary utilities before proceeding with selective demolition that bypass area of selective demolition and that maintain continuity of service to other parts of building.
 - 3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
- D. Utility Requirements: Refer to Division 15 and 16 Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start selective demolition work until utility disconnecting and sealing have been completed and verified in writing.

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. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from the State and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
 - 2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
 - 3. Protect existing site improvements, appurtenances, and landscaping to remain.
- 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 Enclosures: Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
- D. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.
- E. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

3.4 POLLUTION CONTROLS

- A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations.
 - 1. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure. Vacuum carpeted areas.
- B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- C. Cleaning: 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.

3.5 SELECTIVE DEMOLITION

- 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.
 - 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.
 - 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 fire watch 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.
- B. Existing Facilities: Comply with building manager's requirements for using and protecting elevators, stairs, walkways, loading docks, building entries, and other building facilities during selective demolition operations.
- C. Removed and Salvaged Items:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to the State.

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4. Transport items to the State's on-site storage area designated by the State.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by the State, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.6 PATCHING AND REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by selective demolition operations.
- B. Patching: Comply with Division 1 Section 01731 "Cutting and Patching."
- C. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
 1. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.
- D. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.
- E. Floors and Walls: Where walls or partitions that are demolished extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish color, texture, and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
- F. Ceilings: Patch, repair, or rehang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off the State's property and legally dispose of them.

END OF SECTION 01732

SECTION 01770 CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
1. Inspection procedures.
 2. Project Record Documents.
 3. Operation and maintenance manuals.
 4. Warranties.
 5. Instruction of the State's personnel.
 6. Final cleaning.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 2. Make final changeover of permanent locks and deliver keys to the State. Advise the State's personnel of changeover in security provisions.
 3. Complete startup testing of systems. Submit test reports.
 4. Submit test/adjust/balance records.
 5. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 6. Advise the State of changeover in heat and other utilities.
 7. Submit changeover information related to the State's occupancy, use, operation, and maintenance.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, the State will either proceed with inspection or notify Contractor of unfulfilled requirements. The State will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by the State, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

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1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment according to Division 1 Section 01290 "Payment Procedures."
 2. Submit one copy of the State's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by the State. The copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
 5. Deliver tools, spare parts, extra materials, and similar items to location designated by the State. Label with manufacturer's name and model number where applicable.
 6. Submit pest-control final inspection report and warranty.
 7. Instruct the State's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
 8. Complete final cleaning requirements, including touchup painting.
 9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, the State will either proceed with inspection or notify Contractor of unfulfilled requirements. The State will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit one copy of punch list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order.
 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

1.5 PROJECT RECORD DOCUMENTS (AS-BUILTS)

- A. General: Do not use Project Record Documents for construction purposes. Protect Project Record Documents from deterioration and loss. Provide access to Project Record Documents for the State's reference during normal working hours.
- B. Provide Project Record Documents in accordance with the General Conditions.

1.6 OPERATION AND MAINTENANCE MANUALS

- A. Assemble two (2) complete sets of operation and maintenance data indicating the operation and maintenance of each system, subsystem, and piece of equipment not part of a system. Include operation and maintenance data required in individual Specification Sections and as follows:
 - 1. Operation Data: Include emergency instructions and procedures, system and equipment descriptions, operating procedures, and sequence of operations.
 - 2. Maintenance Data: Include manufacturer's information, list of spare parts, maintenance procedures, maintenance and service schedules for preventive and routine maintenance, and copies of warranties and bonds.
- B. Organize operation and maintenance manuals into suitable sets of manageable size. Bind and index data in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.

1.7 WARRANTIES

- A. Submittal Time: Submit written warranties on request of the State for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

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- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

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

PART 3 - EXECUTION

3.1 DEMONSTRATION AND TRAINING

- A. Instruction: Instruct the State's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Provide instructors experienced in operation and maintenance procedures.
 - 2. Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at the start of each season.
 - 3. Schedule training with the State, with at least seven days' advance notice.
 - 4. Coordinate instructors, including providing notification of dates, times, length of instruction, and course content.
- B. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections. For each training module, develop a learning objective and teaching outline.
 - 1. Include instruction for system design and operational philosophy, review of documentation, operations, adjustments, troubleshooting, maintenance, and repair.

3.2 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Sweep concrete floors broom-clean in unoccupied spaces.
 - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - j. Remove labels that are not permanent.
 - k. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - l. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Replace parts subject to unusual operating conditions.
 - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed

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by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

- q. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the State's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01770

SECTION 02080
PIPED UTILITIES - BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Piping materials and installation instructions common to most piping systems.
 - 2. Transition fittings.
 - 3. Dielectric fittings.
 - 4. Sleeves.
 - 5. Identification devices.
 - 6. Grout.
 - 7. Piped utility demolition.
 - 8. Equipment installation requirements common to equipment sections.
 - 9. Concrete bases.
 - 10. Metal supports and anchorages.

1.2 DEFINITIONS

- A. Exposed Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions.
- B. Concealed Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.3 SUBMITTALS

- A. Welding certificates.

1.4 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
 - 1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
 - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.
- C. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

PART 2 - PRODUCTS

2.1 JOINING MATERIALS

- A. Refer to individual Division 2 piping Sections for special joining materials not listed below.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.
- C. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 - 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- D. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- E. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- F. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- G. Brazing Filler Metals: AWS A5.8, BCuP Series, or BAg1, unless otherwise indicated.
- H. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- I. Solvent Cements for Joining Plastic Piping:
 - 1. ABS Piping: ASTM D 2235.
 - 2. CPVC Piping: ASTM F 493.
 - 3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 - 4. PVC to ABS Piping Transition: ASTM D 3138.
- J. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.

2.2 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150-psig minimum working pressure as required to suit system pressures.
- E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
 - 1. Separate companion flanges and steel bolts and nuts shall have 150-psig minimum working pressure where required to suit system pressures.
- F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
- G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

2.3 SLEEVES

- A. Mechanical sleeve seals for pipe penetrations are specified in Division 15 Section 15050 "Basic Mechanical Materials and Methods."
- B. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- C. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- D. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- E. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

2.4 IDENTIFICATION DEVICES

- A. Equipment Nameplates: Metal permanently fastened to equipment with data engraved or stamped.

Piped Utilities – Basic Materials and Methods

1. Data: Manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and essential data.
 2. Location: Accessible and visible.
- B. Plastic Tape: Manufacturer's standard color-coded, pressure-sensitive, self-adhesive vinyl tape, at least 3 mils thick.
1. Width: 1-1/2 inches on pipes with OD, including insulation, less than 6 inches; 2-1/2 inches for larger pipes.
 2. Color: Comply with ASME A13.1, unless otherwise indicated.
- C. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch sequenced numbers. Include 5/32-inch hole for fastener.
1. Material: 0.032-inch thick, polished brass.
 2. Valve Tag Fasteners: Brass, wire-link or beaded chain; or brass S-hooks.
- D. Engraved Plastic-Laminate Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white melamine subcore, unless otherwise indicated. Fabricate in sizes required for message. Provide holes for mechanical fastening.
1. Engraving: Engraver's standard letter style, of sizes and with terms to match equipment identification.
 2. Thickness: **1/16 inch**, unless otherwise indicated.
 3. Thickness: 1/16 inch, for units up to 20 sq. in. or 8 inches in length, and 1/8 inch for larger units.
 4. Fasteners: Self-tapping, stainless-steel screws or contact-type permanent adhesive.

2.5 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 2. Design Mix: 5000-psi, 28-day compressive strength.
 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PIPED UTILITY DEMOLITION

- A. Disconnect, demolish, and remove piped utility systems, equipment, and components indicated to be removed.
 - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
 - 3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - 4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make operational.
 - 5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to State's Representative.
- B. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 2 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping to permit valve servicing.
- E. Install piping at indicated slopes.
- F. Install piping free of sags and bends.
- G. Install fittings for changes in direction and branch connections.
- H. Select system components with pressure rating equal to or greater than system operating pressure.
- I. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.

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1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of equipment areas or other wet areas 2 inches above finished floor level.
 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 - a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
 - b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
- J. Verify final equipment locations for roughing-in.
- K. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.3 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 2 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
 - 3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 - 4. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 - 5. PVC Nonpressure Piping: Join according to ASTM D 2855.
 - 6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.
- L. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
 - 1. Plain-End Pipe and Fittings: Use butt fusion.
 - 2. Plain-End Pipe and Socket Fittings: Use socket fusion.
- M. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.4 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.

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4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment level and plumb, unless otherwise indicated.
- B. Install equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference with other installations. Extend grease fittings to an accessible location.
- C. Install equipment to allow right of way to piping systems installed at required slope.

3.6 IDENTIFICATION

- A. Piping Systems: Install pipe markers on each system. Include arrows showing normal direction of flow.
 1. Plastic markers, with application systems. Install on insulation segment if required for hot noninsulated piping.
 2. Locate pipe markers on exposed piping according to the following:
 - a. Near each valve and control device.
 - b. Near each branch, excluding short takeoffs for equipment and terminal units. Mark each pipe at branch if flow pattern is not obvious.
 - c. Near locations where pipes pass through walls or floors or enter inaccessible enclosures.
 - d. At manholes and similar access points that permit view of concealed piping.
 - e. Near major equipment items and other points of origination and termination.
- B. Equipment: Install engraved plastic-laminate sign or equipment marker on or near each major item of equipment.
 1. Lettering Size: Minimum 1/4 inch high for name of unit if viewing distance is less than 24 inches, 1/2 inch high for distances up to 72 inches, and proportionately larger lettering for greater distances. Provide secondary lettering two-thirds to three-fourths of size of principal lettering.
 2. Text of Signs: Provide name of identified unit. Include text to distinguish among multiple units, inform user of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.

- C. Adjusting: Relocate identifying devices that become visually blocked by work of this or other Divisions.

3.7 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 - 1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
 - 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
 - 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 - 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
 - 7. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 3 Section 03300 "Cast-in-Place Concrete."

3.8 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor piped utility materials and equipment.
- B. Field Welding: Comply with AWS D1.1.

3.9 GROUTING

- A. Mix and install grout for equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.

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- G. Place grout around anchors.
- H. Cure placed grout.

END OF SECTION 02080

SECTION 02100 HAZARDOUS MATERIALS

PART 1 - GENERAL

1.1 DESCRIPTION OF THE WORK

- A. Hollister Hills – Ranger's office and Administration Building
- B. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. No hazardous materials have been removed by the State before start of the Work.
 - 2. If additional unknown materials suspected of containing hazardous materials are encountered, including but not limited to C through G below, do not disturb; immediately notify the State's Representative.
- C. Asbestos.
- D. Lead Paint.
- E. Roofing.
- F. Transite.
- G. Demolition.

1.2 PRODUCTS AND SETUP

- A. All poly used must be minimum of 6 mil, fire retardant.
- B. All encapsulating materials used must be submitted for approval per Section 00700 General Conditions, and must be fully compatible with other products that will be installed at a later date.
- C. At a minimum, a fully compliant OSHA wash station must be established for all workers who may encounter lead paint or asbestos. The wash station water must be captured and filtered to 2 microns prior to disposal.

1.3 IMPLEMENTATION

- A. Transite:
 - 1. Sheets must be taken down in tact. If the sheets are broken, the edges must be taped.
 - 2. If sheets are too large or too cumbersome to remove in tact, tape the area to be broken, score the area and break the Transite at the tape joints.

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3. Before removal from the job site, the sheets must be double wrapped in 6 mil fire retardant poly.
4. Label all packages as asbestos using approved labels.

B. Lead wall tiles:

1. These may remain in place during demolition.

C. Roof patch (approximately 1 sq. ft.):

1. Remove the patch and wrap in two layers of 6 mil fire retardant poly.
2. Wrapped material should be carefully lowered to the ground and disposed as ACM waste.

D. Lead paint:

1. Remove loose and peeling paint.
2. Intact paint may remain on building components and can be treated as general construction debris following appropriate waste handling.
3. Following removal of the building, clean up all paint chips and/or other debris and dispose as lead containing waste.

1.4 PRE ABATEMENT SUBMITTALS

- A. Written work plan and sketches for this project
- B. Contractor's business license and DOSH registration.
- C. Insurance certificate with the State named as additionally insured.
- D. Notifications.
- E. Waste hauler information.
- F. EPA approved disposal site information.
- G. Water runoff plan.
- H. Emergency phone numbers.
- I. AHERA and DHS training certificates for supervisors and workers.
- J. Employee medical records.
- K. Respirator fit tests.
- L. Equipment lists and data.
- M. Medical Surveillance Program.

N. Respiratory Protection Program.

1.5 REGULATORY COMPLIANCE

A. Contractor shall comply with the following listed applicable Federal and State regulations.

B. Contractor shall comply with local regulations.

C. The current issue of each specified document shall govern. Where conflict among regulations exist, the more stringent shall be applicable.

D. OSHA

1. CFR 1926.1101, Asbestos Construction Standard.
2. CFR 1910.1001, Asbestos General Industry Standard.
3. 29 CFR 1926.62, Lead Standard.
4. CFR 1910.134, Respiratory Protection Standard.
5. CFR 1910.141, Hygiene and Shower Facilities Standard.
6. CFR 1910.20, Access to Medical Records.
7. CFR 1926.1101, Local Exhaust Ventilation System Standard.
8. CFR 1910.1200, Hazard Communication Standard.

E. CALIFORNIA and CAL-OSHA

1. Title 22 CCR, Section 12503, Environmental Exposures.
2. Proposition 65.
3. Title 8 CCR, 341.6/341.14, Asbestos Related Work.
4. Title 8 CCR, Section 1529, Asbestos Construction Standard.
5. Title 8 CCR, Section 5208, Asbestos General Industry Standard.
6. Title 8 CCR, Section 5208.1, Asbestos General Industry Standard, non-asbestiform tremolite, actinolite, anthophyllite.
7. Title 8 CCR, 1532.1 California Lead Standard.
8. Title 17 CCR Division 1, Chapter 8 Accreditation, Certification and Work Practices for Lead-Based Paint and Lead Hazards.
9. Title 8 CCR, Section 1531, Respiratory Protection Standard.
10. Title 8 CCR, Section 3366, 3367, Hygiene and Shower Facilities Standard.
11. Title 8 CCR, Section 3204, Access to Medical Records.
12. Title 8 CCR, Section 5143, Local Exhaust Ventilation System Standard.
13. Title 8 CCR, Section 5194, Hazard Communication Standard.
14. Title 8 CCR, Sections 1500-1938, Construction Safety Order.
15. Title 8 CCR, Sections 2299-2974, Electrical Safety Orders.
16. Title 8 CCR, Section 3221, Fire Prevention.
17. Title 8. Emergency Action Plan.
18. Title 8 CCR, Section 5144, Respiratory Protection Equipment.
19. Title 8 CCR, GISO Section 3203, Injury and Illness Prevention Plan.
20. Title 8 CCR, Section 6003, Accident Prevention Signs.

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F. EPA

1. Title 40 Code of Federal Regulations, Section 763, Asbestos Hazard Emergency Response Act.
2. Office of Toxic Substances, Asbestos Containing Materials in School Buildings, A Guidance Document, parts 1 & 2.

G. NESHAP

1. Title 40 Code of Federal Regulations, Part 61, Subparts A & B, National Emissions Standard for Hazardous Air Pollutants, USEPA Publication EPA 560-5-83-002.
2. Federal Register Vol. 55, No. 224, National Emission Standards for Hazardous Air Polutants; Asbestos NESHAP Revision; Final Rule, November 20, 1990: if asbestos content is estimated to be less than 10 perecnt by a method other than point counting, such as visual estimation, EPA has revised the definition to require that the determination be repeated using the point counting technique with PLM.

H. Regulations and Requirements of the local Air Quality Management district.

I. Codes and Standards

1. ASTM – American Society for Testing Materials.
2. ANSI – American National Standards Institute.
3. ULI – Underwriters Laboratories, Inc.
4. NIST – National Institute of Standards and Technology.
5. NFPA – National Fire Protection Association.
6. NEC – National Electrical Code.

1.6 WORKER REQUIREMENTS

A. All workers will have the following training an/or certifications:

1. Asbestos worker training per AHERA.
2. Lead worker training per DHS.

B. All supervisors wil have the following training and/or certifications:

1. Asbestos supervisor per AHERA.
2. Lead supervisor certification per DHS.

C. A lead supervisor must be present at all times.

D. Blood lead level requirements:

1. All workers and supervisors must have their blood lead levels tested within 2 weeks before starting to work on this project.

2. To qualify and work on this project each worker must have a documented blood lead level less than 15 mg/dl of blood.
3. Blood lead levels must be re-tested within one week of leaving this job.

1.7 CLEARANCE

- A. After the removal of each designated material, advise KELLCO when the work area is ready for visual/tactile inspection.

1.8 WASTE MANAGEMENT, LABELING, DISPOSAL AND MANIFESTS

Contractor is responsible for:

- A. Prior to removal of the waste from the work area, the State's Representative employee must be available to count waste bags exiting work area.
- B. Waste will be disposed by the Contractor at an appropriate waste facility approved by the State.
- C. The Contractor must submit certified weight tickets for each load of waste to the State. All certified weight tickets must be submitted within 15 days of shipping waste from the site.
- D. The waste generator is the State of California Department of Parks and Recreation.
- E. The emergency phone number for box #15 of the manifest is to be provided by the State.
- F. Waste manifests will be signed by an authorized representative of the State.
- G. The EPA ID number will be provided by the State.
- H. The State Board of Equalization Tax account will be provided by the State.
- I. Any waste storage containers left by the Contractor onsite, during the course of abatement, will be rigid on all sides and securable via lock and key.
- J. All waste containers will be moved from the site by the Contractor at the end of the abatement project.
- K. The waste containers (bags, drums, etc.) must have proper labeling for the hazardous materials they contain.
- L. The address of the removal site :

HOLLISTER HILLS SVRA
7800 CIENEGA ROAD, HOLLISTER,

SAN BENITO COUNTY, CALIFORNIA 95023

- M. Disposal of Contractor's waste will be according to NESHAP 40 CFR 61.

1.9 CLOSE OUT DOCUMENTATION

- A. Submit 2 copies of the following documentation:
 - 1. Worker training certificates.
 - 2. Worker medical certifications.
 - 3. Blood lead test results within 1 week of leaving the project.
- B. Worker fit test certifications.
- C. Air monitoring results.
- D. Rotometer calibration documentation.
- E. Manometer charts.
- F. Manifest and weight slips.
- G. Clearance punch list.
- H. Any other submittals as directed by the consultant or the State.

END OF SECTION 02100

SECTION 02221 BUILDING DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes demolition and removal of the following:
 - 1. Partial demolition to structures necessary for building addition and interior modifications.
- B. See Division 2 Section 02100 "Hazardous Materials" for building clearing and removal of above and below grade improvements part of building demolition.
- C. See Division 2 Section 02230 "Site Clearing" for site clearing and removal of above and below grade improvements not part of building demolition.

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 recycled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to State's Representative.
- C. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or recycled.

1.3 MATERIALS OWNERSHIP

1.4 SUBMITTALS

- A. Qualification Data: For the following:
 - 1. Demolition firm.
 - 2. Professional engineer.
- B. Proposed Protection and Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify options if proposed measures are later determined to be inadequate. Include measures for the following:
 - 1. Environmental protection.
 - 2. Dust control.
 - 3. Noise control.

Building Demolition

- C. Schedule of Building Demolition Activities: Indicate detailed sequence of demolition and removal work, with starting and ending dates for each activity, interruption of utility services, and locations of temporary protection and means of egress.
- D. Predemolition photographs: Show existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by building demolition operations. Submit before Work begins.
- E. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.5 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Standards: Comply with ANSI A10.6 and NFPA 241.
- D. Predemolition Conference: Conduct conference at Project site with State's Representative prior to proceeding with demolition work.

1.6 PROJECT CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before start of Work.
- B. Conduct building demolition so park operations will not be disrupted.
 - 1. Provide not less than 72 hours notice to State's Representative of activities that will affect Park operations.
 - 2. Maintain access to existing walkways, exits, and other adjacent occupied or used facilities.
 - a. Do not close or obstruct walkways, exits, or other occupied or used facilities without written permission from the State's Representative..
- C. The State assumes no responsibility for buildings and structures to be demolished.
 - 1. Conditions existing at time of inspection for bidding purpose will be maintained by the State as far as practical.

- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. No hazardous materials have been removed by the State before start of the Work.
 - 2. If additional unknown materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify the State's Representative.
- E. Hazardous material remediation is specified in Division 2, Section 02100 "Hazardous Materials" Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified in Section 02100 of the Contract Documents.
 - 1. Hazardous material remediation is specified in Division 2, Section 02100 "Hazardous Materials" in the Contract Documents.
- F. Storage or sale of removed items or materials on-site is not permitted.

1.7 COORDINATION

- A. Arrange demolition schedule so as not to interfere with the Park's on-site operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Satisfactory Soils: Comply with requirements in Division 2 Section 02300 "Earthwork" when applicable.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Survey existing conditions and correlate with requirements indicated to determine extent of building demolition required.
- B. Review Construction Documents of existing construction provided on drawings. State does not guarantee that existing conditions are same as those indicated in Contract Documents.
- C. Inventory and record the condition of items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to State's Representative.

Building Demolition

- E. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.
- F. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

3.2 PREPARATION

- A. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving buildings and structures to be demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
 - 2. If utility services are required to be removed, relocated, or abandoned, before proceeding with building demolition provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
 - 3. Cut off pipe or conduit a minimum of 24 inches below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
- B. Existing Utilities: Refer to Contract Documents for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.
- C. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
- D. Removed and Salvaged Items: Comply with the following:
 - 1. Clean salvaged items of dirt and demolition debris.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in secure area until delivery to the State.
 - 4. Transport items to State's designated storage area.
 - 5. Protect items from damage during transport and storage.

3.3 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, pavement, park furniture, and natural vegetation and landscaping to remain during demolition operations.
- B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during demolition. When permitted by the State's Representative, items may be removed to a suitable, protected storage location during demolition and reinstalled in their original locations after demolition operations are complete.

- C. Existing Utilities: Maintain utility services indicated to remain and protect them against damage during demolition operations.
 - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by the State and authorities having jurisdiction.
 - 2. Provide temporary services during interruptions to existing utilities, as acceptable to the State and to authorities having jurisdiction.
 - a. Provide at least 72 hours' notice to the State if shutdown of service is required during changeover.
- D. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated. Comply with requirements in Division 1 Section 01500 "Temporary Facilities and Controls" and Section 00810 "Constraints and Mitigations."
 - 1. Protect existing site improvements, appurtenances, and landscaping to remain.
 - 2. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 3. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.
 - 4. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.

3.4 DEMOLITION, GENERAL

- A. General: Demolish as indicated on plans, existing buildings, structures, interiors, and site improvements completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Do not use cutting torches until work area is cleared of flammable materials. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
 - 2. Maintain adequate ventilation when using cutting torches.
 - 3. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Engineering Surveys: Perform surveys as the Work progresses to detect hazards that may result from building demolition activities.
- C. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

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1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from the State and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.

3.5 EXPLOSIVE DEMOLITION

- A. Explosives: Use of explosives is not permitted.

3.6 SITE RESTORATION

- A. Below-Grade Areas: Rough grade below-grade areas ready for further excavation or new construction.
- B. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials according to backfill requirements in Division 2 Section 02300 "Earthwork."
- C. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.7 REPAIRS

- A. General: Promptly repair damage to adjacent construction caused by building demolition operations.
- B. Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
- C. Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

3.8 RECYCLING DEMOLISHED MATERIALS

- A. General: Separate recyclable demolished materials from other demolished materials to the maximum extent possible. Separate recyclable materials by type.
 1. Provide containers or other storage method approved by the State's Representative for controlling recyclable materials until they are removed from Project site.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from demolition area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Transport recyclable materials off State property and legally dispose of them.

- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling building demolition materials shall accrue to Contractor.

3.9 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain State's property, remove demolished materials from Project site and legally dispose of them in an EPA-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.

- B. Burning: Do not burn demolished materials.

- C. Disposal: Transport demolished materials off the State's property and legally dispose of them.

3.10 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.

END OF SECTION 02221

SECTION 02230 SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Removing trees and other vegetation.
 - 2. Clearing and grubbing.
 - 3. Topsoil stripping.
 - 4. Removing above-grade site improvements.
 - 5. Disconnecting, capping or sealing, and abandoning site utilities in place.
 - 6. Disconnecting, capping or sealing, and removing site utilities.
 - 7. Removal of Asphalt concrete and aggregate base pavement.

1.2 MATERIALS OWNERSHIP

- A. Except for materials indicated to be stockpiled or to remain State's property, cleared materials shall become Contractor's property and shall be removed from the site.

1.3 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
- B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on State's premises where indicated.
- C. Notify utility locator service for area where Project is located before site clearing.
- D. Trees to remain and earth within drip lines must be undisturbed.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Satisfactory Soil Materials: As specified in Division 2 Section 02300 "Earthwork."
 - 1. Obtain approved borrow soil materials off-site when satisfactory soil materials are not available on-site.

PART 3 - EXECUTION

Section 02230 – Page 2
Site Clearing

3.1 PREPARATION

- A. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- B. Locate and clearly flag trees and vegetation to remain or to be relocated.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Restore damaged improvements to their original condition, as acceptable to State.

3.2 UTILITIES

- A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
- B. Do not interrupt utilities serving facilities occupied by State or others unless permitted. Arrange to provide temporary utility services.
- C. Excavate for and remove underground utilities indicated to be removed.

3.3 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding 8-inch loose depth, and compact each layer to a density equal to adjacent original ground.

3.4 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
- C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.

3.5 DISPOSAL

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

discretion, surplus satisfactory soils may be placed within the park, approximately 4 miles from the construction site, via dirt and asphalt roads or hauled off site and legally disposed of.

END OF SECTION 02230

SECTION 02235
WATER POLLUTION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section describes the following work:

1. Implementation of sediment, erosion control, and spill prevention measures during construction, and upon close-out of construction contract.
2. Maintenance and repair of erosion, sediment control, and spill prevention measures during the construction period.

B. Related Sections:

1. Section 02300: Earthwork
2. Section 02920: Lawns and Grasses

C. Definitions:

1. Construction Period: Between the dates of Notice to Proceed and Substantial Completion of the work.
2. Maintenance Period: Between the date of Notice to Proceed and completion of work or the end of the rainy season.

PART 2 - PRODUCTS

2.1 MATERIALS AND PROCEDURES

- A.** All materials and procedures required to execute the installation and maintenance of Best Management Practices (BMP's) for erosion and sediment control, and for spill prevention, containment, and cleanup of any non-sediment pollutants shall meet the minimum criteria defined in the *California Stormwater Best Management Practices Handbook*, 2004 (the handbook). This handbook is available at the following website:

www.cabmphandbooks.com/construction.asp

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

- A. At a minimum, the Contractor shall install and maintain temporary erosion and sediment control measures (BMP's) for erosion and sediment control, and for spill prevention, containment, and cleanup for any non-sediment pollutants that shall meet the minimum criteria defined in the *California Stormwater Best Management Practices Handbook*, 2004 (the handbook). These measures shall be implemented and maintained throughout the construction and upon close-out of construction contract.
- B. During the construction period, the Contractor shall maintain onsite sufficient quantities of erosion and sediment control materials to be installed in the event that rain is forecast, and for rapid response to failures or emergencies. The Contractor shall consult the local weather forecast daily.
- C. If rain is forecast during construction the Contractor shall, at a minimum, secure all soil stockpiles by covering and/or installing a perimeter silt barrier.

3.2 CLEANUP

- A. Upon completion of the construction period, unless directed by the State's Representative, remove all unused erosion control materials, and remove all used erosion control materials that are no longer needed and dispose of properly offsite. Some BMP's may need to remain in place after construction as part of permanent BMP's or to continue to control potential pollution through the rainy season. Regrade drainage ditches and over-silted areas to even and smooth grade. Leave the site in clean condition acceptable to the State.

END OF SECTION 02235

SECTION 02300 EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Preparing subgrades.
 - 2. Excavating and backfilling.
 - 3. Drainage course for slabs-on-grade.
 - 4. Subbase course for concrete walks and pavements.
 - 5. Base course for asphalt paving.

1.2 DEFINITIONS

- A. Backfill: Soil materials used to fill an excavation.
- B. Base Course: Layer placed between the subbase course and asphalt paving.
- C. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course Capillary Water Barrier: Layer supporting slab-on-grade used to minimize capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations.
 - 1. Additional Excavation: Excavation below subgrade elevations as directed by Architect. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
 - 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- I. Subbase Course: Layer placed between the subgrade and base course for asphalt paving, or layer placed between the subgrade and a concrete pavement or walk.

Earthwork

- J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
- K. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.3 PROJECT CONDITIONS

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils: See Soils Report for material requirements.
- C. Unsatisfactory Soils: See Soils Report for material requirements.
- D. Backfill and Fill: Satisfactory soil materials.
- E. Subbase: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2- inch sieve and not more than 12 percent passing a No. 200 sieve.
- F. Base: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- G. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- H. Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2- inch sieve and 0 to 5 percent passing a No. 8 sieve.
- I. Detectable Warning Tape: Polyethylene film warning tape encasing a metallic core, minimum 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, freezing temperatures or frost, and other hazards created by earthwork operations. Provide protective insulating materials as necessary.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- C. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- D. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

3.2 EXCAVATION

- A. Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions. See Soils Report for overexcavation requirements.
 - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
- B. Excavate for structures, pavements, and walks to indicated elevations and dimensions. Extend excavations for placing and removing concrete formwork, for installing services and other construction, and for inspections. Trim bottoms to required lines and grades to leave solid base to receive other work.
- C. Excavate utility trenches to indicated gradients, lines, depths, and invert elevations of uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit.
 - 1. Excavate trenches deeper than bottom of pipe elevation, 6 inches deeper in rock, 4 inches deeper elsewhere, to allow for bedding course. Hand excavate for bell of pipe.
- D. Proof roll subgrades, before filling or placing aggregate courses, with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof roll wet or saturated subgrades.

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- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities.
- F. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Architect.
 - 1. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.
- G. Stockpile borrow materials and satisfactory soil materials, without intermixing, in shaped, graded, drained, and covered stockpiles. Stockpile soil materials away from edge of excavations and outside drip line of remaining trees.

3.3 BACKFILLS AND FILLS

- A. Utility Trench Backfill: Place, compact, and shape bedding course to provide continuous support for pipes and conduits over rock and other unyielding bearing surfaces and to fill unauthorized excavations.
 - 1. Place and compact initial backfill of satisfactory soil material or subbase material, free of particles larger than 1 inch, to a height of 12 inches over the utility pipe or conduit. Place and compact final backfill of satisfactory soil material to final subgrade.
 - 2. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.
- B. Fill: Place and compact fill material in layers to required elevations.
- C. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction at or above optimum moisture content.
 - 1. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that is too wet to compact to specified dry unit weight.
- D. Compaction: Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- E. Compact soil to not less than the following percentages of maximum dry density according to ASTM D 1557:
 - 1. Under structures, building slabs, steps, and pavements, scarify and re-compact top 12 inches of existing subgrade and each layer of backfill or fill material at 95 percent.

2. Under walkways and slabs, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill material at 90 percent.
 3. Under unpaved areas, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill material at 85 percent.
- F. Grading: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated. Grade walks, and unpaved subgrades to tolerances of plus or minus 1 inch and pavements and areas within building lines to plus or minus 1/2 inch.
- G. Subbase and Base Courses: Under pavements and walks, place subbase course on prepared subgrade. Place base course material over subbase. Compact to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.
- H. Under slabs-on-grade, place drainage course on prepared subgrade. Compact to required cross sections and thickness to provide stable support for slab.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified independent testing and inspecting agency to perform field tests and inspections and to prepare test reports at no additional cost to the State.
- B. Allow testing agency to test and inspect subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; re-compact and retest until specified compaction is obtained.

3.5 PROTECTION AND DISPOSAL

- A. Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

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- D. Disposal: Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property. At the contractor's discretion, surplus satisfactory soils may be placed within the park, approximately 4 miles from the construction site, via dirt and asphalt roads or hauled off site and legally disposed of.

END OF SECTION 02300

SECTION 02743 PARKING LOT STRIPING

Part 1 - GENERAL

1.1 PRINCIPAL WORK IN THIS SECTION

- A. Coordinate the work in this section with related trades.
- B. Verify applicable dimensions at the job site.
- C. The work includes, but is not necessarily limited to, the furnishing of all materials and the painting of all parking stalls and other traffic markings on pavement as shown and noted on the drawings and specified herein.

1.2 RELATED WORK

- A. Section 02751: Cement Concrete Pavement.
- B. Section 09912: Painting.

Part 2 - PRODUCTS

2.1 TRAFFIC PAINT FOR ASPHALT PAVED SURFACES

Devroe's #15701 Traffic Paint, W. P. Fuller's #282-06 Traffic Line Paint, Glidden's #5510 Traffic Paint, or approved equal, white in color, unless noted otherwise.

2.2 THINNERS

Thinners shall be as recommended by the manufacturers for type of paint used.

Part 3 - APPLICATION

3.1 PARKING LOT STRIPING

Parking lot striping and other markings, such as arrows, "In" and "Out" signs, etc., shall conform to the dimensions and details shown on the drawings.

3.2 STRIPES AND MARKINGS

All stripes and other markings on pavements, as shown on the drawings, shall be applied with the use of substantial cutout patterns and templates. All stripes and markings shall be sharp and accurate straight lines, with no fuzziness or waviness at edges of lines.

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Parking Lot Striping

3.3 METHOD

Stripes and other markings shall be painted by the following methods.

- A. Spray Method: Apply 2 coats, the first being a fog coat and the second being the finish coat.

3.4 COMPLETION

At completion, Contractor shall check their work thoroughly and shall touch up any stripes or markings which are not clear and distinct or which are not uniform in color.

END OF SECTION

SECTION 02751 CEMENT CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes cement concrete pavement for the following applications:
 - 1. Exterior Walkways
 - 2. Truncated Dome Pads

1.2 SUBMITTALS

- A. Product Data: For each manufactured material and product indicated.
- B. Design Mix: For concrete mix indicated.
- C. Material certificates.
- D. (1) one foot square sample of concrete color with the medium broom finish texture for the designers review and approval prior to installation.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with CalTrans Specifications for concrete requirements for production facilities and equipment.
- B. Laboratory Reports: Submit additional copies of Moxie International with the use of Moxie 1800 Super-Admix.

1.3 QUALITY CONTROL AND TEST

- A. Test Cylinders: Hold one (1) additional cylinder in reserve with the use of MOXIE 1800 Super-Admix, or approved equal.

1.4 REFERENCES

- A. ASTM C78 – Flexural Strength of concrete (with third point loading).
- B. ASTM c156 – Water retention by concrete curing materials
- C. ASTM C157 – Shrinkage of Hardened Hydraulic cement mortar and concrete.
- D. ASTM C494 – Chemical Admixtures for concrete
- E. ASTM C618 – Fly ash and raw or calcinated natural pozzolan for use as a mineral admixture in Portland cement concrete.

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- F. ASTM C805 – Rebound number of hardened concrete.
- G. ASTM D4263 – Concrete moisture content – plastic sheet method.
- H. ASTM D5084 – Permeability of saturated porous materials using a flexible wall permeameter.
- I. ASTM E96 – Water vapor transmission of materials.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening steel reinforcement. Manufacture bar supports according to CRSI's "Manual of Standard Practice."

2.2 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II.
 - 1. Fly Ash: ASTM C 618, Class F or C.
 - 2. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Aggregate: ASTM C 33, uniformly graded, from a single source.
- C. Water: ASTM C 94.
- D. Synthetic Fiber: Fibrillated or monofilament polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inch (13 to 38 mm) long.
- E. Admixtures: Certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures, as follows:
 - 1. Air-Entraining Admixture: ASTM C 260.
 - 2. Water-Reducing Admixture: ASTM C 494, Type A.
 - 3. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
 - 4. Moxie 1800 Super-Admix. Admixture: MOXIE International, "MOXIE 1800 SUPER-ADMIX" a liquid, water vapor transmission inhibiting admixture to be added at the batch plant in place of, but not limited to waterproofing solutions, curing agents, shrinkage crack inhibitors, shrinkage reducing admixtures, water reducers, air-entrainment, dustproofing compounds, corrosion inhibitors and plasticizers. ASTM C309, ASTM C494, ASTM C260, ASTM E96 performance

specifications. There is no known equal. Comply with manufacturer's standard recommendations, and application methods of MOXIE International.

F. Related Materials:

1. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752.
2. Coloring Agent: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, non-fading, and resistant to lime and other alkalis. Color shall be Mesquite by Davis Colors or approved equal.

2.3 TRUNCATED DOME PADS

- A. Truncated dome warning panels shall be Black color and surface mounted, as manufactured by ADA Solutions, Inc. or approved equal. Panels shall be mechanically fastened and adhered to the underlying surface using 1/4" x 5/8" yellow composite sleeve anchors with SS pins. Sealant is Sonneborn NP1, Sikaflex 1a, or approved equal.

2.4 CONCRETE MIXES AND MIXING

- A. Concrete Mixes: Prepare design mixes, proportioned according to ACI 211.1 and ACI 301, with the following properties:

1. Engineering lab designed, **6 sack mix minimum**
2. Compressive Strength (28 Days): 3600 PSI.
3. Maximum Water-Cementitious Materials Ratio: 0.50.
4. Slump Limit: 4 inches (100 mm).

- B. Air Content: 8.0 to 10.0 percent.

- C. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd. (0.60 kg/cu. m).

- D. Water Vapor Transmission Inhibiting Admixture shall be MOXIE 1800 SUPER ADMIX at a rate of 60 oz. per cubic yard of concrete mix, (10 oz. per sack per cubic yard of concrete mix);.. Limit of water vapor transmission shall not exceed 0.30 perms, ASTM E94 -Water Vapor Transmission of materials. Limit of transmission of water seepage or permeability not to exceed 7.00×10^{-9} cm/s, at 50 PSI, ASTM D5048 Permeability of Saturated Porous Materials. Notify manufacturer of manufacturer's representative at least 14 days prior of commencement of testing.

1. MOXIE INTERNATIONAL, "MOXIE 1800 SUPER-ADMIX", liquid, inorganic, chemically reactive, complex catalyzed hydrous silicate, water vapor

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transmission inhibiting admixture containing active enzymes. Initially forms an integral gel membrane, reacts in a time released fashion to control the rapid loss of water, eliminate bleed water, reduce the water demand and ultimately transform the soluble calcium hydroxides available after hydration into insoluble, permanent calcium silicate hydrates. Admix forms a cementitious bond within the available capillaries and fills the interconnecting void structure present after hydration. Produces concrete impermeable to water vapor transmission, eliminates alkali efflorescence attack, inhibits corrosion of reinforcing steel, resists absorption of petroleum, acidic and sulfate soils.

- E. Coloring Agent: Add coloring agent at a rate required by the manufacturer for colored concrete applications
- F. Ready-Mixed Concrete: Comply with requirements and with ASTM C 94 and ASTM C 1116.
- G. Project-Site Mixing: Comply with requirements and measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Surface Preparation: Proof-roll prepared sub-base, and remove loose material from surface.
- B. Forms: Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations.
- C. Reinforcement: Accurately position and support reinforcement, and secure against displacement. Set wire ties with ends directed into concrete.
 - 1. Install welded wire fabric in lengths as long as practicable; lap at least one full mesh, and lace splices with wire.
 - 2. Install adequate spacers to keep the wire mesh off the ground and properly suspended for the concrete pour.
- D. Joints: Locate and install construction expansion joints as indicated on the construction drawings.
- E. Saw Joints: As specified on the plans saw cut joints shall be 1" deep and the width of the blade day of placement.
- F. Concrete Sealer: Ready Clear Sealer by Southern Colors, located at 7 Swisher Drive, Cartersville, Georgia, 30120, (800) 291-3063. Using an airless sprayer,

apply two coats at a rate of 1 gal per 200 square feet of concrete surface. Apply the second coat within 2 hours of the full drying of the first coat of sealer.

- G. Concrete Placement: Comply with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete. Place concrete in a continuous operation within planned joints or sections.
1. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Saturate the sub-base material 12 hours prior to concrete pouring. Remoisten the sub-base material prior to the concrete pour.
 2. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping according to recommendations in ACI 309R.
 3. Screed and initial-float concrete surfaces with darby or bull float before excess moisture or bleed water appears on the surface.
 4. Protect concrete from cold or hot weather during mixing, placing, and curing.
- H. Pavement Tolerances: Comply with tolerances in ACI 330.1, "Specification for Plain Concrete Parking Lots."

3.2 FINISHES AND CURING

- A. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surfaces to true planes with gaps below 10-foot- (3-m-) long, unlevelled straightedge not to exceed 1/4 inch (6 mm). Cut down high spots, and fill low spots. Re-float surface immediately to uniform granular texture.
1. Medium Textured Broom Finish: Provide a coarse finish by striating float-finished color concrete surface 1/16 (1.6 mm) deep with a stiff-bristled broom, perpendicular to line of traffic. Revise and resubmit if texture or concrete color does not match the project designer's requirements.
 2. Concrete Sealer: Install Redi-clear Seal by Southern Color, & Swisher Drive, Cartersville, GA 30120, (800-297-3063, or approved equal. Install in two coats as specified by the manufacturer's specifications.
- B. Curing:
1. Moisture cure concrete by above 85⁰ fog spray, continuously wet absorptive cover, or by moisture-retaining-cover curing. Keep surfaces continuously moist for not less than seven days.

3.3 CONCRETE SEALANT

- A. After the concrete is stain the contractor shall install two coats of concrete sealant. Install per manufacturers specifications.

3.4 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective, or does not meet requirements in this Section.
- B. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement.
- C. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 02751

SECTION 02810 IRRIGATION SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes piping, valves, sprinklers, specialties, controls, and wiring for automatic control irrigation system.
- B. See Division 15 Section 15140 "Domestic Water Piping" for water supply piping.

1.2 DEFINITIONS

- A. Circuit or Lateral Line Piping: Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during flow.
- B. Irrigation Main Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.

1.3 SUBMITTALS

- A. Product Data: Include pressure ratings, rated capacities, and settings of selected models for the following:
 - 1. Backflow
 - 2. General-duty valves
 - 3. Specialty valves.
 - 4. Valve boxes.
 - 5. Bubblers.
 - 6. Irrigation specialties.
 - 7. Controller.
 - 8. Controller box.
- B. As-Built Drawings:
 - 1. On full size drawing, provide 2 sets showing irrigation system piping, including plan layout, and locations, types, sizes, capacities, and flow characteristics of irrigation system piping components. Include backflow preventers, valves, piping, bubblers, accessories, controls, and wiring. Show wire size and number of conductors for each control cable.
 - 2. On paper sized to fit inside irrigation controller door, provide laminated, color coded drawing showing irrigation system valves and valve numbers with color coded circuits.
- C. Field quality-control test reports.

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- D. Operation and maintenance data and manuals for each product, with model numbers clearly highlighted, submitted in a single 3-ring plastic binder. Include distributor's contact information for each product.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 PIPES, TUBES, AND FITTINGS

- A. PVC Pipe for Pressure Mainlines: ASTM D 1735, PVC 1120 compound, Schedule 40.
 - 1. PVC Socket Fittings, Schedule 40, ASTM D 2467.
- B. Non-Pressure Laterals: ASTM D 1735, PVC 1120 compound, Schedule 40.
 - 1. PVC Socket Fittings, Schedule 40, ASTM D 2466.
- C. Galvanized Pipe and Fittings: Galvanized steel pipe ASTM A 120. Fittings shall be standard threaded galvanized malleable iron.
 - 1. All galvanized main below grade shall be wrapped with 2-inch wide plastic adhesive tape, #50 "Scotch Wrap" or equal.
- D. Sleeves and Conduit: PVC Pipe, ASTM D 1785, Schedule 40.
- E. Joining Materials:
 - 1. Solvent Cements for Joining PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.

2.3 GENERAL-DUTY VALVES

- A. PVC Ball Valves: MSS SP-122, union type, with full-port ball, socket or threaded detachable end connectors, and pressure rating not less than 150 psig.
 - 1. Material Option: MSS SP-122, of plastic other than PVC and suitable for potable water. Include threaded ends and pressure rating not less than 150 psig, unless otherwise indicated.
 - 2. Manufacturers:
 - a. American Valve, Inc.
 - b. LASCO
 - c. NIBCO INC.; Chemtrol Div.
 - d. Watts Industries, Inc.; Water Products Div.
- B. Valve boxes: Round reinforced, traffic rated, concrete box with bolt-down steel cover. Permanently mark cover VALVE.
 - 1. Product: Christy, or accepted equivalent.

2.4 SPECIALTY VALVES

- A. Plastic Automatic Control Valves: Molded-plastic body, normally closed, diaphragm type with manual flow adjustment, and operated by 24-V ac solenoid.
- B. Quick-Couplers: Factory-fabricated, red brass, two-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key.
 - 1. Keys: Same manufacturer as valve. Provide one key per five quick-couplers. Two key minimum.
- C. Valve Boxes: box and lid, with open bottom and openings for piping; designed for installing flush with grade. Size as required for valves and servicing, min. 12" diameter.
 - 1. Control valve boxes shall be rectangular traffic-rated pre-cast concrete with lockable cast iron or galvanized steel traffic rated covers.
 - a. Valve box lids shall be permanently custom marked with the appropriate station number corresponding to the Plans, i.e., 'RC Valve # ____ (1, 2, 3, etc.).
 - b. Manufacturer: Christy, or accepted equal.
 - 2. Quick coupler valve boxes shall be round pre-cast concrete with lockable cast iron or galvanized steel traffic rated lids. Christy, or accepted equal. Permanently mark lid QCV.

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- D. Drainage Backfill: Cleaned gravel or crushed stone, 3/4 inch minimum to 3 inches maximum.

2.5 SPRINKLERS

- A. Description: Plastic housing and corrosion-resistant interior parts designed for uniform coverage at available water pressure.

- 1. Bubblers: umbrella pattern, with adjustable head flow adjustment.

2.6 IRRIGATION SPECIALTIES

- A. Flex Tube: NPS 1/2, flexible PE or PVC tubing for bubblers.

- B. Swing Joint Assemblies: PVC

- 1. Available manufacturers:

- a. King Brothers
 - b. Nibco
 - c. Rainbird

2.7 AUTOMATIC-CONTROL SYSTEM

- A. Interior Control Enclosures: NEMA 250, Type 12, drip-proof, with locking cover and two matching keys.

- 1. Material: Enameled-steel or sheet metal.
 - 2. Mounting: Surface type for wall mounting.

- B. Control Transformer: 24-V secondary, with primary fuse.

- C. Controller Stations for Automatic Control Valves: 8 station, with capacity for expansion. Each station is variable from approximately 5 to 60 minutes. Include switch for manual or automatic operation of each station. Connect one valve per station.

- D. Timing Device: Adjustable, 24-hour, 14-day clock, with automatic operations to skip operation any day in timer period, to operate every other day, or to operate 2 or more times daily.

- 1. Manual or Semiautomatic Operation: Allows this mode without disturbing preset automatic operation.
 - 2. Nickel-Cadmium Battery and Trickle Charger: Automatically powers timing device during power outages.

- E. Wiring: UL 493, Type UF-B multi-conductor, with solid-copper conductors and insulated cable; suitable for direct burial.

1. Available Manufacturers:
 - a. AFC Cable Systems Inc.
 - b. Alcatel Canada Wire, Inc.
 - c. American Electric Cable Co.
 - d. American Insulated Wire Corp.
 - e. Cerro Wire & Cable Co., Inc.
 - f. Colonial Wire and Cable Co., Inc.
 - g. Essex Group, Inc.; Building Wire Products Division.
 - h. Precision Cable Manufacturing Co., Inc.
 - i. Southwire Company.
 - j. Triangle Wire and Cable Co.
2. Low-Voltage Cables: No. 14 AWG minimum, between controllers and automatic control valves; with jackets of different colors for multiple-cable installation in same trench.
3. Splicing Materials: Manufacturer's packaged kit consisting of insulating, spring-type connector or crimped joint and epoxy resin moisture seal; suitable for direct burial. UL-rated.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Refer to Division 2 Section 02300 "Earthwork" for excavating, trenching, and backfilling.
- B. Install warning tape directly above pressure piping.
- C. Install piping and wiring in sleeves under sidewalks and paving.
- D. Provide minimum cover over top of underground piping according to the following:
 1. Irrigation Main Piping: Minimum depth of 18 inches below finished grade.
 2. Circuit (Lateral Line) Piping: 18 inches or 12" in planter areas protected from vehicle traffic.
 3. Sleeves and Conduit: 18 inches.

3.2 FITTING APPLICATIONS

- A. Piping in control-valve boxes and aboveground may be joined with flanges instead of joints indicated.
- B. Transition Fittings: Use transition fittings for plastic-to-metal pipe connections according to the following:
 1. Couplings:

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- a. Underground Piping NPS 1-1/2 (DN 40) and Smaller: Manufactured fitting or coupling.
 - b. Underground Piping NPS 2 (DN 50) and Larger: AWWA transition coupling.
 - 2. Fittings:
 - a. Aboveground Piping: Plastic-to-metal transition fittings.
 - b. Underground Piping: Union with plastic end of same material as plastic piping.
 - C. Transition Fittings: AWWA transition couplings same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
- 3.3 INSTALLATION
- A. Install piping free of sags and bends.
 - B. Install groups of pipes parallel to each other, spaced to permit valve and pipe servicing.
 - C. Install fittings for changes in direction and branch connections.
 - D. Install unions adjacent to valves and to final connections to other components.
 - E. Lay piping on sand bed uniformly sloped without humps or depressions.
 - F. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 - 3. PVC Nonpressure Piping: Join according to ASTM D 2855.
 - G. Piping Connections: Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - H. Underground Valves: Install in valve box with top flush with grade.

- I. Control Valves: Install in control-valve box.
- J. Flush piping with full head of water and install sprinklers after hydrostatic test is completed.
- K. Install control cable in same trench as irrigation piping and at least 2 inches below piping. Provide conductors of size not smaller than recommended by controller manufacturer. Install cable in separate sleeve under paved areas.

3.4 LABELING AND IDENTIFYING

- A. Warning Tapes: Arrange for installation of continuous, underground, detectable warning tape over underground piping, during backfilling of trenches.
- B. Refer to Division 2 Section 02300 "Earthwork" for warning tapes.
- C. Control Boxes and Quick Coupler Boxes: Label and identify as per 2.4, C 1 a & 2.4, C 2.

3.5 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections in the presence of the State's Representative:
 - 1. Leak Test: After piping and valve installation and before installation of heads, charge lateral and main line system to 60 PSI and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Operational Test: After electrical circuitry has been energized, operate controllers, automatic control valves and heads to confirm proper system operation and sprinkler coverage.
 - 3. Test and adjust controls, spray coverage and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Remove and replace non-functional units and retest and reinspect as specified above.

3.6 FIELD TRAINING

- A. Schedule with a minimum of 10 days notice, field training for all interested Park staff on operation of irrigation system, including controller settings, operations, seasonal adjustments, troubleshooting, etc.

3.7 ADJUSTING

- A. Adjust settings of controllers to efficiently irrigate new plantings in the current season.

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- B. Adjust automatic control valves to provide flow rate of rated operating pressure required for each circuit.
- C. Adjust sprinklers so they will be flush with, or not more than 1/2 inch above, finish grade.

END OF SECTION 02810

SECTION 02930 EXTERIOR PLANTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Trees.
2. Shrubs.

1.2 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- C. Planting Soil: Surface soil mixed with imported or manufactured topsoil and soil amendments per the Soil Analysis Report.
- D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.

1.3 SUBMITTALS

- A. Product Data: Topsoil composition.
- B. Samples: Mulch and tree ties.
- C. Product certificates: Fertilizers and Endomycorrhizal Inoculum.
- D. Soil Analysis Report with recommended amendments.
- E. Planting Schedule: Indicating anticipated planting dates for exterior plants.
- F. Listing of quantity and species of plants ordered, nursery supplier(s), and any plant material not available at that time, or proposed substitutions to be reviewed.
- G. Maintenance Instructions: Recommended procedures for maintenance of exterior plants during a calendar year.
- H. All submittals shall be forwarded in a single package to the State Representative, with the exception of 'F' above, which shall be submitted separately.

Exterior Plants

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer who maintains an experienced full-time supervisor on Project site when exterior planting is in progress.
- B. Topsoil Analysis: Furnish soil analysis of existing soil in proposed planting area by a qualified soil-testing laboratory.
- C. Provide quality, size, genus, species, and variety of exterior plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock."
- D. Plants shall be subject to inspection and approval by State Representative upon delivery. Such approval shall not negate the right of inspection and rejection during progress of the work.
- E. Substitutions of plant materials will not be permitted unless authorized in writing by the State Representative prior to procuring plants. If proof is submitted that any plant material specified is not obtainable, a proposal will be considered for use of the nearest equivalent size, species, cultivar, or variety. These provisions shall not relieve the Contractor of the responsibility of obtaining specified materials in advance if special growing conditions or other arrangements must be made in order to supply specified materials.
- F. Contractor shall request the following site observations prior to progressing with the work:
 - 1. Plant material approval and layout
 - 2. Substantial completion to initiate warranty period.
 - 3. Final, at end of warranty period.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of exterior plants during delivery. Do not drop exterior plants during delivery.
- B. Deliver exterior plants after preparations for planting have been completed and install immediately after approval. If planting is delayed more than six hours after delivery, set exterior plants trees in shade, protect from weather and mechanical damage, and keep roots moist.

1.6 WARRANTY

- A. Special Warranty: Warrant exterior plants, for the warranty period indicated, against defects including death and unsatisfactory growth, except for abuse by State or incidents that are beyond Contractor's control.
 - 1. Warranty Period: Ninety (90) days from date of Substantial Completion, or if plants are replaced, 90 days from date of plant replacement.

1.7 MAINTENANCE

- A. Maintain during warranty period by cultivating, watering, weeding, fertilizing, restoring planting saucers, tightening and repairing stakes, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray as required to keep trees and shrubs free of insects and disease. Prune only broken or damaged limbs, maintaining the natural form and character.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.2 EXTERIOR PLANTS

- A. Tree and Shrub Material: Furnish nursery-grown trees and shrubs complying with ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as sun scald, injuries, abrasions, and disfigurement.
 - 1. Provide container-grown trees and shrubs.
 - 2. Potential sources for plants are Elkhorn Native Nursery in Moss Landing or Native Revival Nursery in Santa Cruz.

2.3 PLANTING MATERIALS

- A. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 6 percent organic material content; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.
 - 1. Topsoil Source: Verify suitability of surface soil to produce topsoil. Amend existing in-place surface soil to produce topsoil.

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- C. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GM, GC, SW, SP, SM, and SC soil groups, or a combination of the groups, free of rock or gravel larger than 2 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
- D. Organic Soil Amendments:
 - 1. Compost: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve.
 - 2. Wood Derivatives: Decomposed, nitrogen-treated sawdust, ground bark, or wood waste; of uniform texture, free of chips, stones, sticks, soil, or toxic materials.
 - 3. Calcium: Natural Gypsum in powder form.
- E. Fertilizer:
 - 1. Slow-Release Fertilizer: 97% organic, 3% mined ingredient, pelleted slow release fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium, by Biosol, or approved equal, in the following composition:
 - a. Composition: 7-2-3
 - 2. Fertilizer, Tablets: 21-gram tablet consisting of nitrogen, phosphorous, and potassium, by weight.
 - a. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
 - b. Product: Agriform, or approved equal.
 - c. Quantity as shown on planting details
- F. Endomycorrhizal Inoculum
 - 1. AM 120, or approved equal, consisting of spores, mycelium and mycorrhizal root fragments in a solid carrier. Inoculum shall include one or more species of endomycorrhiza of the genus glomus. The label shall include certification for each species of endomycorrhizal fungus and a certified propagule count of each species. Material shall be transported and stored per manufacturer's recommendations and applied at a rate of 60 lbs. per acre. Inoculum available from Pacific Coast Seed, or other.
- G. Tree stakes:
 - 1. 2" x 2" x 8' redwood or 2" diameter lodgepole pine stakes
 - 2. Ties: flexible elastic webbing
- H. Mulches:

1. Organic Mulch: Provided by Park. Contractor to haul from location within park and install.

2.4 PLANTING SOIL MIXES

- A. Planting Soil Mix: Per Soil Analysis Report:

PART 3 - EXECUTION

3.1 EXTERIOR PLANTING

- A. Bed Establishment:

1. Loosen subgrade of planting beds to a minimum depth of 8 inches.
2. Remove stones larger than 4 inches in any dimension and sticks, roots, rubbish, and other extraneous matter.
3. Apply soil amendments and fertilizer per Soil Analysis Report and endomycorrhizal inoculum to the surface of planting beds and thoroughly blend throughout each planting areas.
4. Finish Grading: Grade planting beds to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades of planting areas.

- B. Trees and Shrubs:

1. Pits: Excavate circular pits with sides sloped inward. Leave center area raised slightly to support root ball and assist in drainage. Do not further disturb base. Scarify sides of plant pit smeared or smoothed during excavation.
2. Set trees and shrubs plumb and in center of pit with top of root ball slightly above adjacent finish grades.
 - a. Container Grown: Carefully remove root ball from container without damaging root ball or plant.
 - b. Place planting soil mix around root ball in layers, tamping to settle mix and eliminate voids and air pockets. When pit is approximately one-half backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed. Water again after placing and tamping final layer of planting soil mix.

- C. Tree and Shrub Pruning: Prune only to remove injured or dead branches or to correct structural deficiencies. Retain the natural character of each plant.

- D. Planting Bed Mulching:

1. Apply specified mulch to entire planting areas and finish level 1" below adjacent finish grades. Apply per plan details. Do not place mulch against plant stems.

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- E. Protect exterior plants from damage due to landscape operations, operations by other contractors and trades, and others. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged exterior planting to the satisfaction of the State Representative.

3.2 CLEAN UP

Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris. Dispose in accordance with Section 01700.

END OF SECTION 02930

SECTION 03300 CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes cast-in-place concrete, including reinforcement, concrete materials, mix design, placement procedures, and finishes.
- B. See Division 2 Section 02300 "Earthwork" for drainage fill under slabs-on-grade.

1.2 SUBMITTALS

- A. Product Data: For each manufactured material and product indicated.
- B. Design Mixes: For each concrete mix indicated.
- C. Shop Drawings: Include details of steel reinforcement placement including material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports.
- D. Material certificates or test reports.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
- B. Comply with ACI 301, "Specification for Structural Concrete," including the following, unless modified by the requirements of the Contract Documents.
 - 1. General requirements, including submittals, quality assurance, acceptance of structure, and protection of in-place concrete.
 - 2. Formwork and form accessories.
 - 3. Steel reinforcement and supports.
 - 4. Concrete mixtures.
 - 5. Handling, placing, and constructing concrete.
- C. Pre-installation Conference: Conduct conference at Project site.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Formwork: Furnish formwork and form accessories according to ACI 301.

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B. Steel Reinforcement:

1. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
2. Plain-Steel Wire: ASTM A 82, as drawn.

C. Concrete Materials:

1. Portland Cement: ASTM C 150, Type II.
2. Normal-Weight Aggregate: ASTM C 33, uniformly graded, not exceeding 1-1/2-inch nominal size for foundations and 3/4" for slabs..
3. Water: Complying with ASTM C 94.

D. Admixtures:

1. Air-Entraining Admixture: ASTM C 260.
2. Water-Reducing Admixture: ASTM C 494, Type A.
3. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
4. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
5. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

E. Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber

F. Curing Materials:

1. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
2. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf.
3. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
4. Water: Potable.
5. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

2.2 CONCRETE MIXES

A. Comply with ACI 301 requirements for concrete mixtures.

B. Prepare design mixes, proportioned according to ACI 301, for normal-weight concrete determined by either laboratory trial mix or field test data bases, as follows:

1. Compressive Strength (28 Days): As noted on drawings.
2. Slump: 4 inches.
 - a. Slump Limit for Concrete Containing High-Range Water-Reducing Admixture: Not more than 8 inches after adding admixture to plant- or site-verified, 2- to 3-inch slump.

2.3 CONCRETE MIXING

- A. Ready-Mixed Concrete: Comply with ASTM C 94
 - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
 - 2. When temperature is below 40 degrees F or is likely to fall below 40 degrees F during 24 hour period after placing, provide adequate equipment for heating concrete materials. No frozen materials or materials containing ice shall be used. Temperatures of separate materials, including mixing water, when placed in mixer shall not exceed 100 degrees F. When placed in forms concrete shall have a temperature between 50 degrees F and 85 degrees F.
- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.
 - 1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
 - 2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
- C. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Formwork: Design, construct, erect, shore, brace, and maintain formwork according to ACI 301.
- B. Steel Reinforcement: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
 - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- C. Joints: Construct joints true to line with faces perpendicular to surface plane of concrete.
 - 1. Construction Joints: Locate and install so as not to impair strength or appearance of concrete, at locations indicated or as approved by State Representative. Maintain on-hand materials as necessary, and install

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construction joint whenever interruptions of concrete placement may otherwise result in a cold joint.

2. Isolation Joints: Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - a. Extend joint fillers full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
 3. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
 - a. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
 - b. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Tolerances: Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

3.2 CONCRETE PLACEMENT

- A. Comply with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.
- B. Do not add water to concrete during delivery, at Project site, or during placement.
 1. Consolidate concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
- C. Follow recommended ACI 306 procedures when air temperature falls below 40 degrees F., as approved by State's Representative. Concrete placed in freezing temperatures shall have a temperature of not less than 50 degrees F. Maintain this temperature for at least 7 days. No chemicals or salts shall be used to prevent freezing and no accelerating agents shall be used without prior approval from State's Representative.

3.3 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.
 - 1. Apply to concrete surfaces not exposed to public view.
 - B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Completely remove fins and other projections.
 - 1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
 - 2. Do not apply rubbed finish to smooth-formed finish.
 - 3. Apply smooth-rubbed finish, defined in ACI 301, to smooth-formed finished concrete.
 - C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.
- 3.4 FINISHING UNFORMED SURFACES
- A. General: Comply with ACI 302.1R for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
 - B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on the surface.
 - 1. Do not further disturb surfaces before starting finishing operations.
 - C. Scratch Finish: Apply scratch finish to surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finish, unless otherwise indicated.
 - D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
 - E. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.

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- F. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.
- G. Nonslip Broom Finish: Apply a nonslip broom finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

3.5 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection, and follow recommendations in ACI 305R for hot-weather protection during curing.
- B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions occur before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.
- D. Cure formed and unformed concrete for at least seven days as follows:
 - 1. Moisture Curing: Keep surfaces continuously moist with absorptive cover, water saturated and kept continuously wet.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: The Contractor will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Tests will be performed according to ACI 301.

1. Testing Frequency: One composite sample for each day's pour of each concrete mix exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
2. Testing Frequency: At least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mix placed each day.

END OF SECTION 03300

SECTION 06100 ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Wood framing.
2. Wood supports.
3. Wood blocking.
4. Wood cants.
5. Wood nailers.
6. Wood furring.
7. Wood grounds.
8. Wood sheathing.
9. Wood subflooring.
10. Wood underlayment.
11. Plywood backing panels.
12. Building wrap.

1.2 SUBMITTALS (Submit under provisions of Section 01330)

A. Product Data: For each type of process and factory-fabricated product indicated.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that materials comply with requirements.
2. Certification for waterborne preservative and that moisture content was reduced to 19 percent maximum, after treatment.

B. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses.

C. Research/Evaluation Reports: For the following:

1. Treated wood.
2. Engineered wood products.
3. Foam-plastic sheathing.
4. Power-driven fasteners.
5. Powder-actuated fasteners.
6. Expansion anchors.
7. Metal framing anchors.
8. Building wrap.

1.3 QUALITY ASSURANCE

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A. General:

1. Coordinate the work of all trades to ensure proper placement of all materials, anchors, etc., as well as providing for openings and anchors for the installation of surface mounted materials and equipment.
2. Qualifications for Workmen: Provide sufficient skilled workmen and supervisors who shall be present at all times during execution of this portion of the work and who shall be thoroughly familiar with the type of construction involved and the materials and techniques specified.
3. Rejection: In the acceptance or rejection of rough carpentry, no allowance will be made for lack of skill on the part of the workmen.

B. Standards and References: (Latest Edition unless otherwise noted)

1. 2007 California Building Code (CBC).
2. Lumber: West Coast Lumber Inspection Bureau (WCLIB); Standard Grading Rules for West Coast Lumber No. 17.
3. Lumber: Western Wood Products Association (WWPA); Western Lumber Grading Rules 05.
4. Redwood: Redwood Inspection Service (RIS); Standard Specifications for Grades of California Redwood Lumber.
5. Wood Sheathing: The Engineered Wood Association; Specifications and Grades.
 - a. Structural Plywood: United States Product Standard PS1, Group 1 Douglas Fir.
 - b. APA rated sheathing: United States Product Standard PS2
6. Wood Preservative: American Wood-Preservers' Association (AWPA):
 - a. U1, Use Category System: User Specification for Treated Wood
 - b. M4, Standard for the Care of Preservative-Treated Wood Products
7. 2005 National Design Specification for Wood Construction (NDS).

C. Tests and Inspections:

1. A testing program is required prior to start of construction. Testing program to be done in Compliance with the 2007 CBC requirements and in collaboration with Testing Laboratory, Design team, contractor, owner and submitted for review by the agency in charge of building enforcement. Requirements below are minimum requirements; additional requirements may be required in final testing program.
2. If indicated on the Structural Drawings, load test expansion and epoxy anchors as indicated on the drawings.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Protection:

1. After delivery, store all materials off the ground, covered, and in such a manner as to ensure proper ventilation and drainage and to protect against damage and the weather. Maintain wood at the maximum moisture levels indicated in Materials Section

2. Keep all material clearly identified with all grade marks legible; keep all damaged material clearly identified as damaged, and separately store to prevent its inadvertent use. Do not allow installation of damaged or otherwise non-complying material
3. Use all means necessary to protect the installed work and materials of all other trades
4. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
 1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. For exposed lumber indicated to receive stained or natural finish, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.
 3. Provide dressed lumber, S4S, unless otherwise indicated.
 4. Provide dry lumber with 19 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.
 5. Lumber (Wood Framing): Meet requirements of following minimum grades. All grades to WCLIB Grading Rules No. 17. Species shall be Douglas Fir – Larch

<u>Item</u>	<u>Sizes</u>	<u>Grade</u>	<u>Maximum Moisture Content at Initial Use</u>	<u>Notes</u>
All Material	2x	No. 2	19%	Unless Noted Otherwise
All Material	3x, 4x	No. 2	30%	Unless Noted Otherwise
All Material	6x	No. 1	30%	Unless Noted Otherwise
Decking	2x	Select Dex	19%	

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6. “At initial use” shall be that point at which nails, screws, bolts, split rings, shear plates or other fasteners or the holes for said fasteners are placed in the wood.
7. All sawn lumber is assumed to be enclosed in the dry building envelope in the final service condition, unless noted otherwise, and free to dry to moisture content less than 19%.
8. The Contractor shall use whatever means necessary, including site drying to ensure that the moisture contents above are not exceeded.
9. All studs, plates, joists, rafters and beams 3x and thicker shall be free of heart center in accordance with the specified grading standards.

B. Wood Structural Panels:

1. Plywood: DOC PS 1
2. Oriented Strand Board: DOC PS 2.
3. Comply with “Code Plus” provisions in APA Form No. E30K, “APA Design/Construction Guide: Residential & Commercial.”
4. Roof Structural Sheathing: PS1 and PS2 APA rated sheathing with exterior glue. Thickness type and grade shall be as indicated on Drawings.
5. Wall Structural Sheathing: Rough Sawn textured, PS1 and PS2 APA rated sheathing with exterior glue. Thickness type and grade shall be as indicated on Drawings.
6. Wood Sheathing: Each panel shall be legibly identified as to type, grade and specie by APA grade. If plies are spliced, the slope of the scarf shall not be steeper than 1:8. White pockets will not be permitted in face plies.

2.3 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPAC2 (lumber), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPAC31 with inorganic boron (SBX). Conform to CBC Section 2303.1.8.
- B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber.
- C. Mark each treated item with treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review conforming to CBC Section 2303.1.8.1.
- D. Cut surfaces and bored holes in pressure treated wood shall be protected in accordance with AWPAM4.
- E. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 3. Wood framing members less than 18 inches above grade.
 4. Wood floor plates that are installed over concrete slabs directly in contact with earth.
- F. Fire Treatment: All fire-retardant-treated wood shall be identified with a label meeting the requirements of CBC Section 2303.2.1. The treating process and results thereof shall meet the requirements of CBC Section 2303.2. Moisture content of fire-retardant-treated wood shall meet CBC Section 2303.2.5. Treater shall submit design and fastener values for treated wood to Structural Engineer for review. See Drawings for location of fire-retardant-treated wood.

2.4 DIMENSION LUMBER

- A. General: Of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated.
- B. Non-Load-Bearing Interior Partitions: Construction, Stud, or No. 2 grade and any of the following species:
1. Northern species; NLGA.
 2. Western woods; WCLIB or WWP.
- C. Framing Other Than Non-Load-Bearing Partitions: Construction or No. 2 grade and any of the following species:
1. Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south; NLGA, WCLIB, or WWP.
- D. Exposed Framing: Hand select material for uniformity of appearance and freedom from characteristics that would impair finish appearance.

2.5 TIMBER AND MISCELLANEOUS LUMBER

- A. For timbers of 5-inch nominal size and thicker, provide material complying with the following requirements:
1. Species and Grade: Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south; No. 1 grade; NLGA, WCLIB, or WWP.
- B. Provide miscellaneous lumber for support or attachment of other construction, including the following:
1. Rooftop equipment bases and support curbs.

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2. Blocking.
3. Cants.
4. Nailers.
5. Furring.
6. Grounds.

2.6 SHEATHING

- A. Plywood Wall Sheathing: Exterior, Structural I sheathing.
- B. Plywood Roof Sheathing: Exterior, Structural I sheathing.
- C. Oriented-Strand-Board Roof Sheathing: Exposure 1, Structural I sheathing.

2.7 SUBFLOORING AND UNDERLAYMENT

- A. Plywood Subflooring: Exterior, Structural I single-floor panels or sheathing.
- B. Oriented-Strand-Board Subflooring: Exposure 1, Structural I sheathing.
- C. Plywood Underlayment for Resilient Flooring: DOC PS 1, Exterior A-C with fully sanded face.
- D. Plywood Underlayment for Ceramic Tile: DOC PS 1, Exterior, C-C Plugged, 5/8 inch thick, for ceramic tile set in epoxy mortar.
- E. Particleboard Underlayment: ANSI A208.1, Grade PBU.

2.9 WOOD POLYMER DECKING

- A. Wood-polymer composite decking material.
- B. Size: 2X6.
- C. Color: Natural
- D. Manufacturers:
 1. Trex, Mobil Chemical Company, Composite Products Division.
 2. TimberTech Wood Composites.
 3. Fiber Composites LLC, Fiberon.
 4. Epic Plastics Bella Rosso Composites
 5. Weather Best Decking
 6. Approved equal.

2.8 PLYWOOD BACKING PANELS

- A. Telephone and Electrical Equipment Backing Panels:. Plywood Backing for Electrical, telephone, and similar types of wall mounted equipment shall be

provided hereunder where required. Plywood shall be 3/4-inch thick exterior A-C plywood with 'A' face exposed.

2.9 MISCELLANEOUS MATERIALS

- A. Rough Hardware Fastenings and Connections: All types including bolts, lag screws, nails, spikes, screws, washers and other rough hardware, of kinds that may be purchased and that require no further fabrication, shall be furnished and installed for all finish and rough carpentry and shall conform to 2005 NDS Standards and dimensions.
1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M of Type 304 stainless steel.
 2. All nails used into pressure treated lumber shall be hot-dipped galvanized per ASTM A123 or stainless steel.
 3. Power-Driven Fasteners: CABO NER-272.
 4. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.
 5. Common wire nails or spikes unless noted otherwise on the Drawings. Box nails and sinker nails are not permitted. Vinyl coating is permitted on nails when not exposed to weather.
 6. Bolts: Bolt material shall conform to ASTM A307, Grade A. Bolt dimensions shall conform to ANSI/ASME B18.2.1 with hex head of sizes indicated.
 7. Lag Screws: Lag screws shall conform to ASTM 307, Grade A. All lag screws shall have hex heads where exposed
 8. Washers: Standard flat washers shall conform to ANSI B18.22.1, Type A, Wide Pattern. Steel plate washers shall be Simpson BP or BPS or equivalent. Malleable iron washers shall be standard malleable iron washers.
 9. Powder Driven Fasteners: Tempered steel pins with special corrosive resistant plating or coating. Pins shall have guide washers to accurately control penetration. Fastening shall be accomplished by low-velocity piston-driven power activated tool. Pins and tool shall be as manufactured by Hilti Fastening Systems or equivalent. See Drawings for size, type and embedment.
- B. Metal Framing Anchors: Made from hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.
1. Manufacturers:
 - a. KC Metals Products, Inc.
 - b. Silver Metal Products, Inc.
 - c. Simpson Strong-Tie Company, Inc.
 - d. United Steel Products Company, Inc.

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2. Research/Evaluation Reports: Provide products acceptable to the State for which code research/evaluation reports exist that show compliance of metal framing anchors, for application indicated, with codes in effect for Project.
 3. Allowable Design Loads: Meet or exceed those indicated per manufacturer's published values determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.
 4. Fabricated Metal Timber Framing Connectors: Connectors shall be punched for nailing and bolting. Nails and nailing shall conform to the manufacturer's instructions with a nail provided for each punched hole. All connectors must have specific ICC approval. Types as noted on Drawings are Simpson Strong-Tie. Hardware suppliers other than Simpson shall submit a comparative material list itemizing product designation, load rating and supported member size for review by the enforcement agency and the Structural Engineer.
- C. Building Paper: Asphalt-saturated organic felt complying with ASTM D 226, Type I (No. 15 asphalt felt), unperforated. Fed. Spec. UU-B-790a, Type I, Grade B (15 lb. min. unless noted otherwise).
- D. Building Wrap: Air-retarder sheeting made from polyolefins; cross-laminated films, woven strands, or spun-bonded fibers; coated or uncoated; with or without perforations; and complying with ASTM E 1677, Type I.
1. Manufacturers:
 - a. Celotex Corporation (The); Building Products Division.
 - b. DuPont (E. I. du Pont de Nemours and Company).
 - c. Parsec, Inc.
 - d. Raven Industries, Inc.
 - e. Reemay, Inc.
 - f. Simplex Products.
 - g. Sto-Cote Products, Inc.
 - h. Tenneco Building Products.
 2. Thickness: Not less than 3 mils.
 3. Permeance: Not less than 10 perms.
 4. Flame-Spread Index: 25 or less per ASTM E 84.
 5. Allowable Exposure Time: Not less than three months.
- E. Building Wrap Tape: Pressure-sensitive plastic tape recommended by building wrap manufacturer for sealing joints and penetrations in building wrap.
- F. Sheathing Tape: Pressure-sensitive plastic tape for sealing joints and penetrations in sheathing and recommended by sheathing manufacturer for use with type of sheathing required.

- G. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.
- H. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturers.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection:
 - 1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly proceed.
Verify that rough carpentry may be performed in strict accordance with the original design and all pertinent codes and regulations.
 - 2.
- B. Discrepancies: In the event of discrepancy, immediately notify Architect. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 INSTALLATION

- A. Install Fire Blocks per: 708.2 Where required. Fire blocking shall be provided in the following locations:
 - 1.) In concealed spaces of stud walls and partitions, including furred spaces, at the ceiling and floor levels and at ten foot intervals both vertical and horizontal. See also Section 803, Item 1.
- B. 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, and similar supports to comply with requirements for attaching other construction.
- C. Selection of Lumber Pieces: Carefully select all members. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing or making proper connections. Cut out and discard all defects which will render a piece unable to serve its intended function.
- D. Lumber may be rejected by the Architect, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.
- E. Shimming: do not shim any framing component.

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- F. Care shall be taken that notching and boring of members is in strict conformance with the Drawings and that there are no over-cuts.
- G. Apply field treatment complying with AWP A M4 to cut surfaces of preservative-treated lumber and plywood.
- H. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. CABO NER-272 for power-driven fasteners.
 - 2. Published requirements of metal framing anchor manufacturer.
 - 3. Table 23-II-B-1, "Nailing Schedule," and Table 23-II-B-2, "Wood Structural Panel Roof Sheathing Nailing Schedule," in the Uniform Building Code.
- I. Use finishing nails for exposed work, unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
- J. Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.
- K. Comply with applicable recommendations contained in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.
 - 1. Comply with "Code Plus" provisions in above-referenced guide.
- L. Apply building paper horizontally with 2-inch overlap and 6-inch end lap; fasten to sheathing with galvanized staples or roofing nails. Cover upstanding flashing with 4-inch overlap.
- M. Building Wrap Application: Cover wall sheathing with building wrap as indicated. Cover upstanding flashing with 4-inch overlap. Seal seams, edges, and penetrations with tape.
- N. Apply sheathing tape to joints between sheathing panels and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

3.3 FASTENING

- A. Fastening Methods
 - 1. Combination Subfloor-Underlayment: Glue and nail to wood framing.
 - 2. Subflooring: Glue and nail to wood framing.
 - 3. Sheathing: Nail to wood framing.
 - 4. Underlayment: Nail to subflooring.
 - 5. Plywood Backing Panels: Nail or screw to supports.

- B. Nailing: Except as otherwise indicated on Drawings or specified, all nailing shall be as required by CBC Table 2304.9.1 - Fastening Schedule.
1. Nails or Spikes shall be common wire unless noted otherwise. Penetration of nails or spikes shall be one-half the length of the nail or spike into the piece receiving the point. However, to connect pieces 2" in thickness, 16d nails shall be used unless noted otherwise.
 - a. Bore holes for nails wherever necessary to prevent splitting.
 - b. Use finish or casing for finish work.
 - c. Use of machine nailing is subject to a satisfactory installation of nails. Minimum edge distances shall be maintained. Nails installed through sheathing with nail guns shall not penetrate into the outer plies deeper than hand nailing. Submittal of guns and nails is required.
 - d. All nailing into Pressure-Treated lumber shall utilize hot-dipped zinc coated galvanized nails or stainless steel nails per CBC Section 2304.9.5.
- C. Bolts and Lag Screws: Bolts shall be sizes indicated on Drawings. Holes for bolts shall be 1/16-inch larger than the bolt diameter. Malleable, Steel plate or standard flat washers shall be used where heads or nuts would otherwise bear directly on wood surfaces. Malleable or plate washers shall be used on all anchor bolts. Cut washers are not permitted. Lag screws shall be screwed (not driven) into place. For the shank, holes shall be bored the same depth and diameter as shank. For threaded portion, holes shall be pre-drilled as follows:

Lag Screw Size	Thread Portion Pre-Drill
1/2" diameter	1/4" diameter
5/8" diameter	5/16" diameter
3/4 diameter	3/8" diameter
7/8" diameter	1/2" diameter
1" diameter	5/8" diameter

- in. Soap Lag screws prior to installation. Tighten all bolts and screws before closing
- D. Framing Devices: Install according to the manufacturer's instructions unless otherwise noted.

3.4 FRAMING AND ROUGH CARPENTRY

- A. Sills: Shall be in long lengths of sizes shown, fastened with anchor bolts as indicated, a minimum of two anchor bolts per piece. Place steel plate washers (but not standard flat or malleable iron washers) under nuts bearing on wood. Set sills level and true.

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- B. Studs, Posts and Columns: Shall be full length. Corners shall be as detailed. Partitions or walls containing plumbing, heating or other piping shall be so formed as to give proper clearance for materials. Cut members as required to provide full bearing at ends. Connect to structure as indicated.
- C. Plates: Shall be full length of wall segment or 12-foot minimum and spliced as shown.
- D. Blocking: Blocking shall be same thickness and width of studs or joists unless shown otherwise. Blocking shall not be spaced over 8'-0" c.c. Install fire blocking in accordance with CBC. Horizontal fire blocking in walls shall be placed at floor lines and ceiling lines unless noted otherwise. Install blocking at all plywood joints where noted on the Drawings. Install wall width full height solid blocking at floor joists beneath all posts in walls. Blocking shall be installed around all wall, floor and roof penetrations.
- E. Joists and Beams: Shall be full span length and spliced over bearings unless shown otherwise. Install with crown side up. Beams or headers indicated to be built up of two or more joists shall be fabricated on the job using full length members. For two piece 2x members, stitch nail pieces together with 16d common nails spaced not over 12 inches c.c. and staggered. Clinch nails protruding through members. For three or more piece members, stitch bolt pieces together with ½" bolts spaced not over 12 inches c.c. and staggered.
 - 1. Provide double joists and headers at all openings through roof unless otherwise shown on Drawings.
 - 2. Provide typical headers at all openings through walls where one or more studs are required to be cut. For penetration through walls narrower than stud spacing, provide solid blocking on all sides for fastening finish materials
- F. Wood Sheathing: Install to pattern indicated and provide blocking at joints where noted on the Drawings. Center all joints over bearing supports. Nail to framing as indicated. Install wood sheathing with face plies perpendicular to joists or studs unless indicated otherwise. Wall wood sheathing shall continue uninterrupted by ceilings or soffit from floor to floor or floor to roof unless specifically detailed on the Structural Drawings.
- G. Wood Furring, Stripping: Install as shown or required to provide nailing materials or passage of pipes, conduits, etc., not otherwise accommodated including ceiling stripping for gypsum drywall construction.
- H. Bridging: Space not over 8'-0" c.c. for spans over 16'-0". Joists 8 inches or less in depth shall not require bridging unless specifically indicated
- I. Solid Wood Backing: Solid wood backing shall be provided for all wall and ceiling finishes and for supporting of mounted items for all trades, including but not limited to metal toilet partitions, toilet room accessories, frames, cabinets, casework, mirrors, trim, applied wall finishes, athletic equipment, food service

equipment, piping, conduit, ducts, etc. Contractor shall coordinate placement of backing and supports with Subcontractor supplying mounted items.

- J. Building Paper: Install in all locations indicated except where included in other sections of the specifications.
- K. Cant Strips and Crickets: Shape to sizes shown. Rigidly fasten to construction. Form neat mitered corners
- L. Wood Sheathing Backing: All toilet rooms, restrooms, single or joint occupancy shall have all walls backed with 5/8-inch thick wood sheathing with no surface voids. Install sheathing between the framing members and wallboard. The same wood sheathing shall also be provided and installed at all tile locations. At tile locations wood sheathing shall be installed between the framing members and the resin-cement backing board.

3.5 MISCELLANEOUS CARPENTRY WORK

- A. Install all items under other sections specified to be furnished and installed in other sections which relate to the rough carpentry work.
- B. Miscellaneous Carpentry Work not included under other sections but, indicated or required yet not specified elsewhere shall be furnished and installed hereunder, including appropriate fastening devices. Contractor shall provide miscellaneous carpentry work for all sections and divisions of work identified.
- C. Wood Curbs for Equipment: Construct all wood curbs for roof mounted equipment as detailed. Provide all miscellaneous blocking, bracing, supports, and other wood items as shown or required to complete the work.
- D. Fire/Draft Stops: Construct fire and drafts stops in furred attic spaces where indicated or required by CBC code. Unless otherwise indicated on Drawings construct of not less than 5/8-inch Type 'X' gypsum wallboard or 1/2" wood sheathing, adequately supported by 2x4's at 24 inches c.c., braced diagonally to the roof structure. Draft stop and installation work shall conform to code requirements.
- E. Shoring and Bracing: Shore or brace for temporary support of all work as required during the construction period except any shoring and bracing specified and included under other sections of these specifications.
- F. Temporary Enclosures: Provide and maintain all barricades and enclosures required to protect the work in progress.
- G. Protect all work in progress and all work installed, as well as the work of all other trades. Any work damaged as a result of the work under this section shall be

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corrected to its original condition or replaced if directed by the Architect at no increase in cost to the Owner.

- H. Ventilation: Contractor shall include all labor and materials necessary to provide ventilation requirements of roof overhangs, eaves, attics, and all other components of the building required by codes to be ventilated. Work shall include removing knock-outs in wood I-joists for cross ventilation, drilling of blocking, wood sheathing, and other wooden components of the structure necessary to comply with requirements of the CBC for ventilation of buildings.

END OF SECTION 06100

SECTION 06176
METAL-PLATE-CONNECTED WOOD TRUSSES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Wood roof trusses.
 - 2. Wood girder trusses.
 - 3. Truss accessories.
- B. See Division 6 Section 06100 "Rough Carpentry" for supplementary framing and permanent bracing.

1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal-plate-connected wood trusses capable of withstanding design loads indicated without exceeding TPI 1 deflection limits.

1.3 SUBMITTALS

- A. Product Data: For metal-plate connectors, metal framing anchors, bolts, and fasteners indicated.
- B. Shop Drawings: Show location, pitch, span, camber, configuration, and spacing for each type of truss required; species, sizes, and stress grades of lumber; splice details; type, size, material, finish, design values, orientation, and location of metal connector plates; and bearing details.
 - 1. Include structural analysis data signed and sealed by a qualified Civil Engineer registered in California.
- C. Qualification Data: For the following:
 - 1. Metal-plate manufacturer.
 - 2. Fabricator.
- D. Research/Evaluation Reports: For the following:
 - 1. Metal-plate connectors.
 - 2. Metal framing anchors.

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Metal-Plate-Connected Wood Trusses

1.4 QUALITY ASSURANCE

- A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with TPI quality-control procedures for manufacture of connector plates published in TPI 1.
 - 1. Manufacturer's responsibilities include preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- B. Fabricator Qualifications: Shop that participates in a recognized quality-assurance program that involves inspection by SPIB, Timber Products Inspection, TPI, or other independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.
- C. Comply with TP1 1, "National Design Standard for Metal Plate Connected Wood Truss Construction," and TPI H1B, "Commentary and Recommendations for Handling, Installing & Bracing Metal Plate Connected Wood Trusses."
- D. Wood Structural Design Standard: Comply with applicable requirements in AFPA's "National Design Specifications for Wood Construction" and its "Supplement."

PART 2 - PRODUCTS

2.1 DIMENSION LUMBER

- A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review.
- B. Grade and Species: Truss chords and web members shall be of grade and species noted on the drawings and graded visually or mechanically, and capable of supporting required loads without exceeding allowable design values according to AFPA's "National Design Specifications for Wood Construction" and its "Supplement."

2.2 METAL PRODUCTS

- A. Metal Connector Plates: Fabricate connector plates to comply with TPI 1 from hot-dip galvanized steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation; Designation SS, Grade 33, and not less than 0.036 inch (0.9 mm) thick.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Alpine Engineered Products, Inc.
 - b. CompuTrus, Inc.
 - c. Eagle Metal Products.
 - d. Jager Industries, Inc.
 - e. Mitek Industries, Inc.
 - f. Robbins Manufacturing Company.
 - g. TEE-LOK Corporation.
 - h. Truswal Systems Corporation.
 - i. Approved equal fabricator.
- B. Fasteners: provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
 1. Nails, Wire, Brads, and Staples: FS FF-N-105.
 2. Power-Driven Fasteners: CABO NER-272.
 3. Wood Screws: ASME B18.6.1.
 4. Lag Bolts: ASME B18.2.1. (ASME B18.2.3.8M).
 5. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- C. Metal Framing Anchors: Provide framing anchors made from hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Alpine Engineered Products, Inc.
 - b. Cleveland Steel Specialty Co.
 - c. Harlen Metal Products, Inc.
 - d. KC Metals Products, Inc.
 - e. Silver Metal Products, Inc.
 - f. Simpson Strong-Tie Company, Inc.
 - g. United Steel Products Company, Inc.
 3. Allowable Design Loads: Meet or exceed those indicated per manufacturer's published values determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.3 FABRICATION

- A. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly with joints closely fitted

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Metal-Plate-Connected Wood Trusses

to comply with tolerances in TPI 1. Position members to produce design camber indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install and brace trusses according to TPI recommendations and as indicated. Install trusses plumb, square, and true to line and securely fasten to supporting construction.
- B. Anchor trusses securely at bearing points; use metal framing anchors. Install fasteners through each fastener hole in metal framing anchor according to manufacturer's fastening schedules and written instructions.
- C. Securely connect each truss ply required for forming built-up girder trusses. Anchor trusses to girder trusses as indicated.
- D. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.
 - 1. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.
- E. Install wood trusses within installation tolerances in TPI 1.
- F. Do not cut or remove truss members.
- G. Return wood trusses that are damaged or do not meet requirements to fabricator and replace with trusses that do meet requirements.

END OF SECTION 06176

SECTION 06200 FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Standing and running trim.
 - 2. Siding.

1.2 SUBMITTALS

- A. Product Data: For each type of factory-fabricated product and process indicated.
- B. Samples: For the following:
 - 1. Each type of finish required.
 - 2. Each type of siding required.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber Standards: Comply with DOC PS 20, "American Softwood Lumber Standard," for lumber and with applicable grading rules of inspection agencies certified by the American Lumber Standards Committee Board of Review.
- B. Softwood Plywood: Comply with DOC PS 1, "U.S. Product Standard for Construction and Industrial Plywood."
- C. Hardwood Plywood: Comply with HPVA HP-1, "Interim Voluntary Standard for Hardwood and Decorative Plywood."
- D. Preservative Treatment: Comply with NWWDA I.S. 4 for exterior finish carpentry to receive water-repellent preservative treatment.
- E. Fire-Retardant Treatment: Where indicated, use materials impregnated with fire-retardant chemicals per AWPAC20; exterior type or interior Type A as required.

2.2 STANDING AND RUNNING TRIM

- A. Exterior Standing and Running Trim: Finished lumber and moldings.
 - 1. Species and Grade: Rough Sawn-textured, Clear All Heart western red cedar; NLGA, WCLIB, or WWPA.

Finish Carpentry

2.3 SIDING

- A. Plywood Siding: Exterior-type, APA 303 series siding, thickness as indicated, cedar faced, rough sawed textured
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Champion International Corp.
 - b. Forest Tex.
 - c. Georgia-Pacific Corp.
 - d. K Ply Inc.
 - e. Or Approved Equal

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners for Exterior Finish Carpentry: Provide nails of hot-dip galvanized steel.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Condition finish carpentry to average prevailing humidity conditions in installation areas before installation, for a minimum of 24 hours.
- B. Prime and backprime lumber for painted finish exposed on the exterior. Comply with requirements for surface preparation and application in Division 9 Section 09910 "Painting."

3.2 INSTALLATION

- A. Install finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where required for alignment. Scribe and cut finish carpentry to fit adjoining work. Refinish and seal cuts.
- B. Standing and Running Trim: Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Stagger joints in adjacent and related trim. Cope at returns and miter at corners.
- C. Siding: Install siding and flashing according to manufacturer's written recommendations. Do not allow nails to penetrate more than one thickness of siding, unless otherwise recommended by siding manufacturer. Seal joints at inside and outside corners and at trim locations.
- D. Repair damaged or defective finish carpentry where possible to eliminate functional or visual defects. Where not possible to repair, replace finish carpentry. Adjust joinery for uniform appearance.

END OF SECTION 06200

SECTION 06402
INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes interior woodwork including for the following applications:
 - 1. Plastic-laminate cabinets.
 - 2. Plastic-laminate countertops.
 - 3. Shop finishing of woodwork.
- B. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips, unless concealed within other construction before woodwork installation.

1.2 SUBMITTALS

- A. Product Data: For the following:
 - 1. Cabinet hardware and accessories.
 - 2. Handrail brackets.
 - 3. Finishing materials and processes.
- B. Shop Drawings: Include location of each item, plans and elevations, large-scale details, attachment devices, and other components.
- C. Samples:
 - 1. Lumber and panel products for transparent finish, for each species and cut, finished on one side and one edge.
 - 2. Thermoset decorative-overlay surfaced panel products, for each type, color, pattern, and surface finish.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of woodwork.
- B. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior architectural woodwork, construction, finishes, and other requirements.
 - 1. Provide AWI certification labels or compliance certificate indicating that woodwork complies with requirements of grades specified.
- C. Quality Standard: Unless otherwise indicated, comply with WIC's "Manual of Millwork" for grades of interior architectural woodwork, construction, finishes, and other requirements.

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Interior Architectural Woodwork

1. Provide WIC-certified compliance certificate indicating that woodwork complies with requirements of grades specified.
2. Provide WIC-certified compliance certificate for installation.

1.4 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Wood for Transparent Finish:

1. Species and Cut: White oak, rift sawn or cut, Alder or White ash, plain sawn or sliced.

- B. Wood Products:

1. Hardboard: AHA A135.4.
2. Medium-Density Fiberboard: ANSI A208.2, Grade MD-Exterior Glue.
3. Softwood Plywood: DOC PS 1, Medium Density Overlay.
4. Hardwood Plywood and Face Veneers: HPVA HP-1.

- C. Thermoset Decorative Overlay: Medium-density fiberboard with surface of thermally fused, melamine-impregnated decorative paper complying with LMA SAT-1.

- D. Clear Float Glass for Doors: ASTM C 1036, Type I, Class 1, Quality q3, 6 mm thick, unless otherwise indicated.

- E. Clear Tempered Float Glass for Doors: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3; manufactured by horizontal (roller-hearth) process, with exposed edges seamed before tempering, 6 mm thick, unless otherwise indicated.

- F. High-Pressure Decorative Laminate: NEMA LD 3.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Formica Corporation.

- b. Laminart.
- c. Pioneer Plastics Corp.
- d. Westinghouse Electric Corp.; Specialty Products Div.
- e. Wilsonart International; Div. of Premark International, Inc.

2.2 FIRE-RETARDANT-TREATED MATERIALS

- A. Fire-Retardant-Treated Lumber and Plywood: Materials impregnated with fire-retardant chemical formulations to comply with AWPAC20 (lumber) and AWPAC27 (plywood), Exterior Type or Interior Type A. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Kiln-dry material after treatment.
- B. Fire-Retardant Particleboard: Panels made from softwood particles and fire-retardant chemicals mixed together at time of panel manufacture with flame-spread index of 25 or less and smoke-developed index of 25 or less per ASTM E 84.
- C. Fire-Retardant Fiberboard: ANSI A208.2 medium-density fiberboard panels made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture with flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM E 84.

2.3 CABINET HARDWARE AND ACCESSORIES

- A. Hardware Standard: Comply with BHMA A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.
- B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, self-closing.
- C. Wire Pulls: Back mounted, 4 inches long, 5/16 inches in diameter.
- D. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081.
- E. Drawer Slides: Side-mounted, full-extension, zinc-plated steel drawer slides with steel ball bearings, BHMA A156.9, B05091
- F. Exposed Hardware Finishes: Complying with BHMA A156.18 for BHMA finish number indicated.
 - 1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
 - 2. Bright Chromium Plated: BHMA 625 for brass or bronze base; BHMA 651 for steel base.

2.4 INSTALLATION MATERIALS

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Interior Architectural Woodwork

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

2.5 FABRICATION

- A. General: Complete fabrication to maximum extent possible before shipment to Project site. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.
- B. Wood Cabinets for Transparent Finish:
 - 1. WIC Construction Style: Style B Face Frame.
 - 2. WIC Construction Type: Type I, multiple self-supporting units rigidly joined together
 - 3. WIC Door and Drawer Front Style: Flush Overlay
 - 4. Grain Matching: Run and match grain vertically for drawer fronts, doors, and fixed panels]
 - 5. Matching of Veneer Leaves: Book
 - 6. Veneer Matching within Panel Face: Balance match
 - 7. Provide dust panels of 1/4-inch plywood or tempered hardboard above compartments and drawers
- C. Plastic-Laminate Countertops:
 - 1. High-Pressure Decorative Laminate Grade; HGS
 - 2. Colors, Patterns, and Finishes: per approved submittal
 - 3. Edge Treatment: Same as laminate cladding on horizontal surfaces.
 - 4. Core Material at Sinks: Medium-density fiberboard made with exterior glue.

2.6 SHOP FINISHING

- A. Finish architectural woodwork at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.
- B. Backpriming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork. Apply two coats to back of paneling.
- C. Transparent Finish: Comply with requirements indicated below for grade, finish system, staining, and sheen, with sheen measured on 60-degree gloss meter per ASTM D 523:
 - 1. Grade: Economy
 - 2. WIC Finish System: #2, conversion varnish]
 - 3. Wash Coat for Stained Finish: Apply a vinyl wash coat to woodwork made from closed-grain wood before staining and finishing.
 - 4. Open-Grain Woods: Do not apply filler to open-grain woods.

5. Sheen: Satin, 30-50 gloss units.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Condition woodwork to average prevailing humidity conditions in installation areas and examine and complete work as required, including removal of packing and backpriming before installation.
- B. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified in this Section for type of woodwork involved.
- C. Quality Standard: Install woodwork to comply with WIC Section 26 for the same grade specified in this Section for type of woodwork involved.
- D. Install woodwork level, plumb, true, and straight to a tolerance of 1/8 inch in 96 inches. Shim as required with concealed shims.
- E. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.
- F. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.
- G. Standing and Running Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length of lumber available) to greatest extent possible. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base, if finished.
- H. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation.
 - 1. Fasten wall cabinets through back, near top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer-head screws sized for 1-inch penetration into wood framing, blocking, or hanging strips.
- I. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop. Calk space between backsplash and wall with sealant specified in Division 7 Section 07920 "Joint Sealants."

END OF SECTION 06402

SECTION 07411 METAL ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Factory-formed and field-assembled, batten-seam metal roof panels.

1.2 PERFORMANCE REQUIREMENTS

- A. Wind-Uplift Resistance: Comply with UL 580 for wind-uplift resistance class indicated.
- B. Structural Performance: Capable of withstanding the effects of gravity loads and the following loads and stresses, based on testing according to ASTM E 1592:

1.3 SUBMITTALS

- A. Product Data: For each type of metal roof panel and accessory indicated.
- B. Shop Drawings: Show layouts of metal roof panels, including plans, elevations, sections, details, and attachments to other work.
 - 1. Include details of edge conditions, joints, panel profiles, corners, anchorages, trim, flashings, closures, and accessories.
 - 2. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Coordination Drawings: Drawn to scale and coordinating metal roof panel installation with penetrations and roof-mounted items.
- D. Samples: For each exposed finish.
- E. Material certificates.
- F. Field quality-control inspection reports.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

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Metal Roof Panels

1. Installer's responsibilities include fabricating and installing metal roof panel assemblies and providing professional engineering services needed to assume engineering responsibility.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal roof panel assemblies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
 - a. Structural failures, including rupturing, cracking, or puncturing.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
2. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:
 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PANEL MATERIALS

- A. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M. Notify the state representative if the existing roofing is found to be metal other than sheet steel.
 1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality.
 2. Surface: smooth, flat finish.
 3. Exposed Finishes:
 - a. Siliconized-Polyester Coating: Dry film thickness of not less than 0.2 mil for epoxy primer and 0.8 mil for topcoat.
 - b. High-Performance Organic Finish: Three coat, thermocured system with fluoropolymer coats containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical

properties and coating performance requirements of AAMA 2605, except as modified below:

- 1) Humidity Resistance: 2000 hours.
- 2) Water Resistance: 2000 hours.

4. Concealed Finish: White or light-colored acrylic or polyester backer finish.

B. Panel Sealants:

1. Sealant Tape: Pressure-sensitive, gray polyisobutylene compound sealant tape with release-paper backing; 1/2 inch wide and 1/8 inch thick.
2. Joint Sealant: ASTM C 920; as recommended in writing by metal roof panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.3 UNDERLAYMENT MATERIALS

- A. Felts: ASTM D 226, Type II No. 30, asphalt-saturated organic felts.

2.4 MISCELLANEOUS METAL FRAMING

- A. General: Comply with ASTM C 754 for installation conditions required by manufacture and approved in submittal.

2.5 MISCELLANEOUS MATERIALS

- A. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal roof panels by means of plastic caps or factory-applied coating.

1. Fasteners for Roof Panels: Self-drilling or self-tapping, zinc-plated, hex-head carbon-steel screws, with a stainless-steel cap or zinc-aluminum-alloy head and EPDM or neoprene sealing washer.
2. Fasteners for Roof Panels: Self-drilling or self-tapping 410 stainless or zinc-alloy steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal roof panels.
3. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.
4. Blind Fasteners: High-strength aluminum or stainless-steel rivets.

- B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.6 METAL ROOF PANELS

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Metal Roof Panels

- A. Batten-Seam Metal Roof Panels: Match existing profile, pattern and batten-seam spacing. Factory-formed, assembly designed to be field assembled by covering vertical side edges of adjacent panels with battens and mechanically attaching panels to supports using concealed clips. Include battens and accessories required for weather tight installation.

1. Manufacturers:

- a. AEP-Span.
- b. Architectural Building Components.
- c. Architectural Roofing and Siding, Inc.
- d. ATAS International, Inc.
- e. Berridge Manufacturing Company.
- f. BHP Steel Building Products USA Inc.
- g. CENTRIA Architectural Systems.
- h. Copper Sales Inc.
- i. Custom Panel Industries, LLC.
- j. Delcoa Industries, Inc.
- k. Fabral, Inc.
- l. Fashion, Inc.
- m. Innovative Metals Company, Inc.
- n. K-Metals Inc.
- o. MBCI; Div. of NCI Building Systems.
- p. McElroy Metal, Inc.
- q. Merchant & Evans, Inc.
- r. Metal-Fab Manufacturing, LLC.
- s. Metal Sales Manufacturing Corporation.
- t. Modern Metal Systems, Inc.
- u. Perma-Clad Products.
- v. Petersen Aluminum Corporation.
- w. Vincent Metal Goods.

2. Profile: match existing.

3. Panel Material: Metallic-coated steel sheet, 0.0269 inch thick.

- a. Exterior Finish: Siliconized polyester.
- b. Color: as approved in submittal. Submit range of color within the existing roof color spectrum.

4. Batten Material: per manufacture requirements

- a. Clips: stainless-steel.

5. Sealant: Factory applied on each side of clips under battens.

6. Uplift Rating: UL90.

2.7 ACCESSORIES

- A. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including trim, copings, fasciae, corner units, ridge closures, clips, flashings, sealants, gaskets, fillers, closure strips, valley flashing and similar items. Match material and finish of metal roof panels, unless otherwise indicated.
1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal roof panels.
 2. Clips: Minimum 0.0625-inch- thick, stainless-steel panel clips designed to withstand negative-load requirements.
 3. Cleats: Mechanically seamed cleats formed from minimum 0.0250-inch-thick, stainless-steel or nylon-coated aluminum sheet.
 4. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- B. Flashing and Trim: Formed from 0.0179-inch- thick, metallic-coated steel sheet. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal roof panels.
- C. Gutters: Formed from 0.0179-inch- thick, metallic-coated steel sheet. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- long sections, sized according to SMACNA's "Architectural Sheet Metal Manual." Furnish gutter supports spaced 36 inches o.c., fabricated from same metal as gutters. Provide bronze, copper, or aluminum wire ball strainers at outlets. Finish gutters to match roof fascia and rake trim.
- D. Downspouts: Formed from 0.0179-inch- thick, metallic-coated steel sheet; in 10-foot- long sections, complete with formed elbows and offsets. Finish downspouts to match metal roof panels.

2.8 FABRICATION

- A. General: Fabricate and finish metal roof panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

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Metal Roof Panels

- C. Where indicated, fabricate metal roof panel joints with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will minimize noise from movements within panel assembly.
- D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.
- E. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 UNDERLAYMENT INSTALLATION

- A. Felt Underlayment: Install felt underlayment and building-paper slip sheet on roof sheathing under metal roof panels. Use adhesive for temporary anchorage. Apply at locations indicated on Drawings, in shingle fashion to shed water, with lapped joints of not less than 2 inches.

3.2 METAL ROOF PANEL INSTALLATION, GENERAL

- A. General: Provide metal roof panels of full length from eave to ridge, unless otherwise indicated or restricted by shipping limitations. Anchor metal roof panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 1. Field cutting of metal roof panels by torch is not permitted.
 - 2. Rigidly fasten eave end of metal roof panels and allow ridge end free movement due to thermal expansion and contraction. Predrill panels.
 - 3. Provide metal closures at peaks, rake walls, and each side of ridge caps.
 - 4. Flash and seal metal roof panels with weather closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws.
 - 5. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 - 6. Lap metal flashing over metal roof panels to allow moisture to run over and off the material.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.
 - 1. Coat back side of aluminum roof panels with bituminous coating where roof panels will contact wood, ferrous metal, or cementitious construction.

- C. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal roof panel assemblies.
 - 1. Seal metal roof panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal roof panel manufacturer.

3.3 FIELD-ASSEMBLED METAL ROOF PANEL INSTALLATION

- A. Batten-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each batten-seam joint at location, spacing, and with fasteners recommended by manufacturer.
 - 1. Install clips to supports with self-drilling fasteners.
 - 2. Apply battens to metal roof panel seams, fully engaged to provide weather tight joints.

3.4 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
 - 1. Install components required for a complete metal roof panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
 - 2. Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
 - 3. Provide elbows at base of downspouts to direct water away from building.
 - 4. Tie downspouts to underground drainage system indicated.

3.5 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal roof panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal roof panel installation, clean finished surfaces as recommended by metal roof panel manufacturer. Maintain in a clean condition during construction.

END OF SECTION 07411

SECTION 07620 SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Formed slope roof flashing and trim.
 - 2. Formed wall flashing and trim.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Samples: For each type of sheet metal flashing and trim.

1.3 QUALITY ASSURANCE

- A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- B. Acceptance of Substrate: Prior to installation of Sheet Metal Flashing and Trim, substrate must be approved by contractor. Installation of Sheet Metal Flashing and Trim constitutes acceptance of the substrate by the sub-contractor.
- C. Inspection: Contact the State's Representative at least 48 hours in advance so Representative may review substrate before installation of the Sheet Metal Flashing and Trim.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
- B. Gutters and downspouts shall be galvanized steel, minimum 0.0217 inch thick

2.2 SHEET METALS

- A. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 - 1. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; structural quality.
 - 2. Exposed Finishes: Apply the following coil coating:
 - a. High-Performance Organic Finish: Three-coat thermocured system containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with physical properties and coating performance requirements of AAMA 2604, except as modified for below:
 - 1) Humidity and Salt Spray Resistance: 1000 hours.
 - 2) Color: Match color as selected by State's Representative from manufacturer's full range.

2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Felt Underlayment: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
 - 1. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft..
- C. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
 - 1. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
 - 2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
 - 3. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
- D. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

- E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane or silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

2.4 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
- B. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 1. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- D. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
- E. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
- F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal, and in thickness not less than that of metal being secured.

2.5 SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof Edge Flashing (Gravel Stop) and Fascia Caps: Fabricate in minimum 96-inch- long, but not exceeding 10-foot- long, sections. Furnish with 6-inch- wide joint cover plates. Fabricate from the following material:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.0276 inch thick.
- B. Base Flashing: Fabricate from the following material:
 - 1. Aluminum-Zinc Alloy-Coated Steel: 0.0276 inch thick.
- C. Counterflashing: Fabricate from the following material:

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Sheet Metal Flashing and Trim

1. Aluminum-Zinc Alloy-Coated Steel: 0.0276 inch thick.
- D. Roof-Penetration Flashing: Fabricate from the following material:
 1. Aluminum-Zinc Alloy-Coated Steel: 0.0276 inch thick.
- E. Drip Edges: Fabricate from the following material:
 1. Aluminum-Zinc Alloy-Coated Steel: 0.0276 inch thick.
- F. Eave, Rake, and Ridge Flashing: Fabricate from the following material:
 1. Aluminum-Zinc Alloy-Coated Steel: 0.0276 inch thick.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 1. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
- C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.
- E. 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.
 1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
- F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight,

form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

- G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
 - 1. Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.
- H. Seal joints with elastomeric sealant as required for watertight construction.
- I. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Prein edges of sheets to be soldered to a width of 1-1/2 inches except where prein surface would show in finished Work.
 - 1. Do not solder prepainted, metallic-coated steel sheet.

3.2 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal roof flashing and trim to comply with performance requirements and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.
- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49.
 - 1. Interlock bottom edge of roof edge flashing with continuous cleats anchored to substrate at 16-inch centers.
- C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Secure in a waterproof manner. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with elastomeric sealant.
- D. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:
 - 1. Turn flashing down inside vent piping, being careful not to block vent piping with flashing.
 - 2. Seal with elastomeric sealant and clamp flashing to pipes penetrating roof except for flashing on vent piping.

3.3 WALL FLASHING INSTALLATION

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Sheet Metal Flashing and Trim

- A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Openings Flashing in Frame Construction: Install continuous head, sill, jamb, and similar flashings to extend 4 inches beyond wall openings.

END OF SECTION 07620

SECTION 07920 JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes sealants for the following:
 - 1. Exterior joints in vertical surfaces and nontraffic horizontal surfaces.
 - 2. Exterior joints in horizontal traffic surfaces.
 - 3. Interior joints in vertical surfaces and horizontal nontraffic surfaces.
 - 4. Interior joints in horizontal traffic surfaces.

1.2 SUBMITTALS

- A. Product Data: For each joint sealant product indicated.
- B. Samples: For each joint sealant product indicated.
- C. Schedule: For each sealant showing type, primer, color proposed and for use at each condition and/or location.

1.3 QUALITY ASSURANCE

- A. Sealant Compatibility and Adhesion Testing: Use sealant manufacturer's standard test methods to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
- B. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates.

1.4 WARRANTY

- A. Special Installer's Warranty: Written warranty in which Installer agrees to repair or replace elastomeric joint sealants that do not meet requirements specified in this Section or fail in adhesion within specified warranty period two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with requirements specified in this Section within 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.

2.2 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected from manufacturers full line of available colors.

2.3 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants, General: ASTM C 920.
- B. Low-Modulus Nonacid-Curing Silicone Sealant:
 - 1. Available Products:
 - a. Dow Corning; 790.
 - b. GE Silicones; Silpruf.
 - c. NUCO Industries, Inc.; HiFlex 331 or NuFlex 309.
 - d. Ohio Sealants, Inc.; VP 275.
 - e. Pecora Corporation; 864 or 890.
 - f. Polymeric Systems, Inc.; PSI-641.
 - g. Sonneborn Building Products Div., ChemRex Inc.; Omniseal.
 - 2. Type and Grade: S (single component) and NS (nonsag).
 - 3. Class: 25.
 - 4. Additional Movement Capability: Capable of 50 percent movement in extension and 50 percent movement in compression when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719.
 - 5. Exposure: Use NT (nontraffic).
 - 6. Substrates: Uses M, G, A, and, as applicable to joint substrates indicated, O.

C. Medium-Modulus Neutral-Curing Silicone Sealant:

1. Available Products:
 - a. Dow Corning; 791 or 795.
 - b. NUCO Industries, Inc.; HiFlex 393.
 - c. Polymeric Systems, Inc.; PSI-631.
2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Exposure: Use NT (nontraffic).
5. Substrates: Uses M, G, A, and, as applicable to joint substrates indicated, O.

D. Mildew-Resistant Silicone Sealant:

1. Available Products:
 - a. Dow Corning; 786 Mildew Resistant.
 - b. GE Silicones; Sanitary 1700.
 - c. NUCO Industries, Inc.; NuFlex 302.
 - d. Pecora Corporation; 898 Silicone Sanitary Sealant.
 - e. Polymeric Systems, Inc.; PSI-611.
 - f. Tremco; Tremsil 600 White.
2. Type and Grade: S (single component) and NS (nonsag).
3. Class: 25.
4. Exposure: Use NT (nontraffic).
5. Substrates: Uses G, A, and, as applicable to joint substrates indicated, O.

E. Single-Component Nonsag Urethane Sealant:

1. For joints subject to traffic and not subject to traffic, provide the following:
 - a. Available Products:
 - 1) Mameco International; Vulkem 116.
 - 2) Sika Corporation; Sikaflex - 1a.
 - 3) Sonneborn Building Products Div., ChemRex Inc.; NP 1.
 - b. Type and Grade: S (single component) and NS (nonsag).
 - c. Class: 25.
2. Exposure: Use T (traffic) and NT (nontraffic).
3. Substrates: Uses M,G, A, and, as applicable to joint substrates indicated, O.

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Joint Sealants

F. Single-Component Pourable Urethane Sealant:

1. Available Products:
 - a. Bostik Inc.; Chem-Calk 950.
 - b. Pecora Corporation; NR-201.
 - c. Polymeric Systems, Inc.; Flexiprene PSI-951.
 - d. Sonneborn Building Products Div., ChemRex Inc.; SL 1.
2. Type and Grade: S (single component) and P (pourable).
3. Class: 25.
4. Exposure: Use T (traffic).
5. Substrates: Uses M, G, A, and, as applicable to joint substrates indicated, O.

2.4 LATEX JOINT SEALANTS

A. Latex Sealant: ASTM C 834.

1. Available Products:
 - a. Bostik Inc.; Chem-Calk 600.
 - b. NUCO Industries, Inc.; NuFlex 330.
 - c. Pecora Corporation; AC-20.
 - d. Polymeric Systems, Inc.; PSI-701.
 - e. Sonneborn Building Products Div., ChemRex, Inc.; Sonolac.
 - f. Tremco; Tremflex 834.

2.5 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants with joint substrates.

- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants.
 - 1. Remove foreign material from joint substrates that could interfere with adhesion of joint sealant.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues could interfere with adhesion of joint sealants.
- B. Joint Priming: Prime joint substrates where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.
- D. Sealant Installation: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- E. Install sealant backings to support sealants during application and at position required to produce optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- F. Place sealants so they directly contact and fully wet joint substrates.
 - 1. Completely fill recesses provided for each joint configuration.

Joint Sealants

2. Produce uniform, cross-sectional shapes and depths that allow optimum sealant movement capability.
- G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealants from surfaces adjacent to joint.
 2. Use tooling agents that are approved by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Joint Configuration: Concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
- H. Installation of Preformed Silicone-Sealant System:
1. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
 2. Complete installation of horizontal joints before installing vertical joints. Lap vertical joints over horizontal joints. At end of joints, cut silicone extrusion with a razor knife.
- I. Clean excess sealants or sealant smears adjacent to joints as installation progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.2 JOINT SEALANT SCHEDULE

- A. Exterior joints in the following vertical surfaces and nontraffic horizontal surfaces:
1. Control and Expansion Joints in Cast-in-Place Concrete: Single-component nonsag urethane sealant.
 2. Control and Expansion Joints in Unit Masonry: Single-component nonsag urethane sealant.
 3. Joints between Different Materials Listed above: Single-component nonsag urethane sealant.
 4. Perimeter Joints between Materials Listed above and Frames of Doors and Windows: Single-component nonsag urethane sealant.
- B. Interior joints in the following vertical surfaces and horizontal nontraffic surfaces:
1. Perimeter Joints of Exterior Openings Where Indicated: Single-component nonsag urethane sealant.
 2. Tile Control and Expansion Joints: Single-component nonsag urethane sealant.

3. Vertical Control Joints on Exposed Surfaces of Interior Unit Masonry and Concrete Walls and Partitions: Single-component nonsag urethane sealant.
4. Perimeter Joints between Interior Wall Surfaces and Frames of Interior Doors and Windows: Single-component nonsag urethane sealant.
5. Joints between Plumbing Fixtures and Adjoining Walls, Floors, and Counters: Medium-modulus neutral-curing silicone sealant.

END OF SECTION 07920

SECTION 08110 STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes steel doors and frames.

1.02 SUBMITTALS

- A. Product Data: For each product indicated. Include door designation, type, level and model, material description, label compliance, fire-resistance ratings, and finishes.

1.03 QUALITY ASSURANCE

- A. Steel Door and Frame Standard: Comply with ANSI A 250.8, unless more stringent requirements are indicated.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following: or comparable.
 - 1. Amweld Building Products, Inc.
 - 2. Ceco Door Products; a United Dominion Company.
 - 3. Mesker Door, Inc.
 - 4. Republic Builders Products.
 - 5. Steelcraft; a division of Ingersoll-Rand.

2.02 MATERIALS

- A. Metallic Zinc-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), type B, with a A40 (ZF 120) zinc-iron alloy (galvannealed) coating; stretcher-leveled standard of flatness .

2.03 DOORS

- A. Exterior Doors: Complying with ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level indicated.
 - 1. Level 3 and Physical Performance Level A, Model 1 (Full Flush).
- B. Frame Steel Sheet Thickness:
 - 1. 16 gauge for Level 3 steel doors

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Steel Doors and Frames

2.04 FRAMES

- A. General: ANSI A250.8; conceal fastenings, unless otherwise indicated.
- B. Frame Steel Sheet Thickness:
 - 1. 0.067-inch (14 gauge) for level 3 steel doors.
- C. Door Silencers: Three silencers on single-door frames and two silencers on double-door frames.
- D. Supports and Anchors: Not less than 0.042-inch-thick zinc-coated steel sheet.
- E. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Zinc-coat items that are to be built into exterior walls according to ASTM A 153/A 153M, Class C or D as applicable.

2.05 FABRICATION

- A. General: Fabricate steel door and frame units to comply with ANSI A250.8 free from defects including warp and buckle. Where practical, fit and assemble units in manufacturer's plant.
- B. Exterior Doors: Fabricate doors, panels, and frames from metallic-coated steel sheet. Close top and bottom edges of doors flush as an integral part of door construction or by addition of 0.053-inch- thick, metallic-coated steel channels with channel webs placed even with top and bottom edges.
- C. Core Construction: Manufacturer's standard core construction that produces a door complying with SDI standards.
- D. Clearances for Non-Fire-Rated Doors: Not more than 1/8 inch at jambs and heads, except not more than 1/4 inch between pairs of doors. Not more than 3/4 inch at bottom.
- E. Door-Edge Profile: Square edge, unless beveled edge is indicated.
- F. Tolerances: Comply with SDI 117.
- G. Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements in ANSI A250.6 and ANSI A115 Series specifications for door and frame preparation for hardware.
- H. Frame Construction:

1. Fabricate frames with mitered or coped and continuously welded corners and seamless face joints. Provide temporary spreader bars.
- I. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.
- J. Locate hardware as indicated or, if not indicated, according to ANSI A250.8.

2.06 FINISHES

- A. Factory Prime Finish: Manufacturer's standard, factory-applied coat of rust-inhibiting primer complying with ANSI A250.10 for acceptance criteria.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Placing Frames: Comply with provisions in SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
 1. Wall Anchors: Provide at least three anchors per jamb.
- B. Door Installation: Comply with ANSI A250.8. Shim as necessary to comply with SDI 122 and ANSI/DHI A115.1G.
- C. After installation, remove protective wrappings from doors and frames and touch up prime coat with compatible air-drying primer.

END OF SECTION 08110

SECTION 08211 FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes solid core doors as follows:
 - 1. Doors with medium-density overlay faces
 - 2. Factory fitting wood doors to frames and factory machining for hardware.

1.2 SUBMITTALS

- A. Product Data: For each type of door Include factory-finishing specifications.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details; location and extent of hardware blocking; mortises, holes, and cutouts; requirements for veneer matching; factory finishing and other pertinent data.
- C. Samples: For each face material and finish.

1.3 QUALITY ASSURANCE

- A. Quality Standard: Comply with [WWDA I.S.1-A, "Architectural Wood Flush Doors." AWI's "Architectural Woodwork Quality Standards Illustrated." WIC's "Manual of Millwork."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Algoma Hardwoods Inc.
 - 2. Ampco Products, Inc.
 - 3. Buell Door Company.
 - 4. Chappell Door Co.
 - 5. Eagle Plywood & Door Manufacturing, Inc.
 - 6. Eggers Industries; Architectural Door Division.
 - 7. GRAHAM Manufacturing Corp.
 - 8. Haley Brothers, Inc.
 - 9. Ideal Wood Products, Inc.
 - 10. IPIK Door Company.
 - 11. Lambton Doors.
 - 12. Marlite.

Flush Wood Doors

13. Mohawk Flush Doors, Inc.
14. Oshkosh Architectural Door Co.
15. Poncraft Door Co.
16. Southwood Door Co.
17. Vancouver Door Company, Inc.
18. VT Industries Inc.
19. Weyerhaeuser Company.

2.2 DOOR CONSTRUCTION

A. Doors for Opaque Finish:

1. Grade: Economy.
2. Faces for Interior Doors: Medium density overlay.

B. Interior Medium density overlay-Faced Solid-Core Doors:

1. Core: Either glued block or structural composite lumber.
2. Construction: Five or seven plies with stiles and rails bonded to core, then entire unit abrasive planed before veneering.
3. Construction: Seven plies, either bonded or nonbonded construction.

2.3 FABRICATION

A. Fabricate doors in sizes indicated for Project-site fitting.

B. Factory fit doors to suit frame-opening sizes indicated. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors.

C. Factory machine doors for hardware that is not surface applied.

1. Metal Astragals: Premachine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

D. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Louvers: Factory install louvers in prepared openings.

E. Exterior Doors: Flash top of outswinging doors (with manufacturer's standard metal flashing).

2.4 SHOP PRIMING

- A. Doors for Opaque Finish: Shop prime faces and edges of doors, including cutouts, with one coat of wood primer specified in Division 9 Section 09910 "Painting."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
 - 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- B. Job-Fitted Doors: Align and fit doors in frames with uniform clearances and bevels; do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
 - 1. Comply with NFPA 80 for fire-rated doors.
- C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

END OF SECTION 08211

SECTION 08311
ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Access doors and frames for walls and ceilings.
- B. Related Sections include the following:
 - 1. Section 15820 "Duct Accessories" for heating and air-conditioning duct access doors.

1.2 SUBMITTALS

- A. Product Data: For each type of access door and frame indicated. Include construction details materials, individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details of access doors and frames for each type of substrate and attachments to other work.

1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain access door(s) and frame(s) through one source from a single manufacturer.
- B. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

1.4 COORDINATION

- A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

PART 2 - PRODUCTS

2.1 STEEL MATERIALS

- A. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - 1. Powder-Coat Finish: Immediately after cleaning and pretreating, apply manufacturer's standard thermosetting polyester or acrylic urethane powder coating with cured-film thickness not less than **1.5 mils**. Prepare, treat, and coat metal to comply with resin manufacturer's written instructions.
- B. Drywall Beads: Edge trim formed from **0.0299-inch** zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Acudor Products, Inc.
 - 2. Babcock-Davis; A Cierra Products Co.
 - 3. Bar-Co, Inc. Div.; Alfab, Inc.
 - 4. Cendrex Inc.
 - 5. Dur-Red Products.
 - 6. Elmdor/Stoneman; Div. of Acorn Engineering Co.
 - 7. Jensen Industries.
 - 8. J. L. Industries, Inc.
 - 9. Karp Associates, Inc.
 - 10. Larsen's Manufacturing Company.
 - 11. MIFAB, Inc.
 - 12. Milcor Inc.
 - 13. Nystrom, Inc.
 - 14. Williams Bros. Corporation of America (The).
 - 15. Or Equal
- B. Flush Access Doors and Frames with Exposed Trim: Fabricated from sheet steel
 - 1. Locations: wall and ceiling surfaces.
 - 2. Door: Minimum 0.060 inch thick sheet metal, set flush with exposed face flange of frame.
 - 3. Frame: Minimum 0.060 inch thick sheet metal with 1-inch wide, surface-mounted trim.
 - 4. Hinges: continuous piano

5. Latch: cam latch operated by hex head wrench with interior release.

2.3 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
- C. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.
- C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.2 ADJUSTING AND CLEANING

- A. Adjust doors and hardware after installation for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 08311

SECTION 08520 ALUMINUM WINDOWS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes dual glazed, horizontal sliding windows.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Provide aluminum windows capable of complying with performance requirements indicated, based on testing manufacturer's windows that are representative of those specified and that are of minimum test size required by AAMA/NWWDA 101/I.S.2.
- B. Thermal Transmittance: Provide aluminum windows with a whole-window U-value maximum of 9 or better per AAMA 1503
- C. Specific Product Performance Requirements: Comply with Section 2.2 of AAMA/NWWDA 101/I.S.2 as applicable to types of aluminum windows indicated.

1.3 SUBMITTALS

- A. Product Data: For each type of aluminum window indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, hardware, attachments to other Work, and operational clearances.
- C. Samples: For each exposed finish.
- D. Field quality-control test reports.
- E. Product test reports.
- F. Maintenance data.

1.4 QUALITY ASSURANCE

- A. Fenestration Standard: Comply with AAMA/NWWDA 101/I.S.2, "Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors," for minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
 - 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 WARRANTY

Aluminum Windows

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace aluminum windows that fail in materials and workmanship within 2 years from date of Substantial Completion.
- B. Warranty Period for Glass: 5years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Acorn Window Systems.
 - 2. All Seasons Commercial Division, Inc.
 - 3. Boyd Aluminum Manufacturing.
 - 4. Custom Window Company.
 - 5. DeSCo Windows.
 - 6. EFCO Corporation.
 - 7. EXTECH/Exterior Technologies, Inc.
 - 8. Fleetwood Aluminum Products, Inc.
 - 9. Graham Architectural Products Corp.
 - 10. Kawneer Company, Inc.
 - 11. Mannix; a Division of Interstate Window Corp.
 - 12. Peerless Products, Inc.
 - 13. Reynolds Architectural Systems; Ramco Mfg. Co.
 - 14. Thermal Windows, Inc.
 - 15. TRACO.
 - 16. Winco Manufacturing Co.
 - 17. Window Technologies, Inc.
 - 18. YKK AP America Inc.
 - 19. or equal

2.2 GLAZING

- A. Glass: Clear, insulating-glass unless otherwise noted.
- B. Glazing System: Manufacturer's standard factory-glazing system that produces weathertight seal.

2.3 INSECT SCREENS

- A. Aluminum Insect Screen Frames: Manufacturer's standard aluminum alloy complying with SMA 1004. Fabricate frames with mitered or coped joints, concealed fasteners adjustable rollers, and removable PVC spline/anchor concealing edge of frame.

1. Aluminum Tubular Framing Sections and Cross Braces: Roll formed from aluminum sheet with minimum wall thickness as required for class indicated.
 2. Finish: Match aluminum window members.
- B. Glass-Fiber Mesh Fabric: 20x20 mesh of PVC-coated, glass-fiber threads; woven and fused to form a fabric mesh resistant to corrosion, shrinkage, stretch, impact damage, and weather deterioration in the following color. Comply with ASTM D 3656.
1. Mesh Color: Charcoal gray.
- C. Wickets: Provide sliding wickets, framed and trimmed for a tight fit and durability during handling.

2.4 FABRICATION

- A. General: Fabricate aluminum windows, in sizes indicated, that comply with requirements and that meet or exceed AAMA/NWWDA 101/I.S.2 performance requirements for the following window type and performance class. Include a complete system for assembling components and anchoring windows.
1. Horizontal-Sliding Windows:
- B. Fabricate aluminum windows that are reglazable without dismantling sash or ventilator framing.
- C. Weather Stripping: Provide full-perimeter weather stripping for each operable sash and ventilator.
- D. Weep Holes: Provide weep holes and internal passages to conduct infiltrating water to exterior.
- E. Provide water-shed members above side-hinged ventilators and similar lines of natural water penetration.
- F. Glazing Stops: Provide snap-on glazing stops Provide glazing stops to match sash and ventilator frames.

2.5 FINISHES

- A. Baked-Enamel Finish: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 with a minimum dry film thickness of 1.5 mils, medium gloss.
1. Color: white to match existing.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction.
- B. Set sill members in bed of sealant or with gaskets, as indicated, for weathertight construction.
- C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.
- D. Metal Protection: Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified in "Dissimilar Materials" Paragraph in Appendix B in AAMA/NWDA 101/I.S.2.
- E. Protect window surfaces from contact with contaminating substances resulting from construction operations. In addition, monitor window surfaces adjacent to and below exterior concrete and masonry surfaces during construction for presence of dirt, scum, alkaline deposits, stains, or other contaminants. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written recommendations.
- F. Clean aluminum surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.
- G. Clean factory-glazed glass immediately after installing windows. Comply with manufacturer's written recommendations for final cleaning and maintenance. Remove nonpermanent labels and clean surfaces.
- H. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

END OF SECTION 08520

SECTION 08711 DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Commercial door hardware.
 - 2. Cylinders for doors specified in other Sections.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.

1.3 QUALITY ASSURANCE

- A. Keying : The building shall be keyed in accordance with the existing park key system.
- B. Keys: Deliver keys to the State's Representative.
- C. Templates: Obtain and distribute templates for doors, frames, and other work specified to be factory prepared for installing door hardware.
- D. Standards: Comply with BHMA A156 series standards, Grade 1.
- E. Certified Products: Provide door hardware that is listed in BHMA directory of certified products.

1.4 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fails in materials or workmanship within warranty period.
 - 1. Warranty Period for Locks: Five years from date of Substantial Completion.
 - 2. Warranty Period for Manual Closers: 5 years from date of Substantial Completion.

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Door Hardware

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Product: Subject to compliance with requirements, provide the product named for each door hardware item indicated in Door Hardware Sets.

2.2 DOOR HARDWARE

- A. Scheduled Door Hardware : Scheduled Door Hardware: Provide door hardware according to Door Hardware Sets at the end of Part 3. Manufacturers' names are abbreviated.

2.3 HINGES

- A. Manufacturers:
 - 1. Hinges:
 - a. Bommer Industries, Inc. (BI).
 - b. Hager Companies (HAG).
 - c. Lawrence Brothers, Inc. (LB).
 - d. McKinney Products Company; Div. of ESSEX Industries, Inc. (MCK).
 - e. Stanley Commercial Hardware; Div. of The Stanley Works (ST).
- B. Hinge Base Metal: Unless otherwise indicated, provide the following:
 - 1. Exterior Hinges: Stainless steel, with stainless-steel pin.
- C. Non-removable Pins: Provide set screw in hinge barrel that prevents removal of pin while door is closed .
- D. Screws: Phillips flat-head screws; screw heads finished to match surface of hinges.
 - 1. Fiberglass Doors and Frames: Machine screws (drilled and tapped holes).

2.4 MECHANICAL LOCKS AND LATCHES

- A. Manufacturers :
 - 1. Best Lock Corporation (BLC)
 - 2. Schlage Lock Company; an Ingersoll-Rand Company (SCH).

3. NT Falcon Lock Co.; an Ingersoll-Rand Company (NTF).
 4. Yale Security Inc.; Div. of Williams Holdings (YAL).
- B. Bored Lockset Design: Best 9K Series with 14C lever, Schlage D series with Sparta lever, Falcon T series with Quantum lever, or Yale 5400LN series with Pacific Beach lever.
- C. Backset: 2-3/4 inches unless otherwise indicated.

2.5 DEAD LOCKS

- A. Manufacturers:
1. Best Lock Corporation (BLC)
 2. Schlage Lock Company; an Ingersoll-Rand Company (S).
 3. NT Falcon Lock Co.; an Ingersoll-Rand Company (NTF).
 4. Yale Security Inc.; Div. of Williams Holdings (YAL).
- B. Bored Dead Lock Design: Best T Series, Schlage B660 series, Falcon D830 series, or Yale 3400.
- C. Backset: 2-3/4 inches, unless otherwise indicated.

2.6 CLOSERS

- A. Surface-Mounted Closers:
1. Manufacturers:
 - a. DORMA Door Controls Inc.; Member of The DORMA Group (DC) 8900 Series
 - b. LCN Closers; an Ingersoll-Rand Company (LCN) 4000 & 4200 Series
 - c. Norton Door Controls; Div. of Yale Security Inc. (NDC) 7700 Series
 - d. Sargent Manufacturing Company; Div. of ESSEX Industries, Inc. (SGT) 1430 Series

2.7 PROTECTIVE TRIM UNITS (Kick Plates)

- A. Protective Trim Units: Sized 1-1/2 inches less than door width on push side and 1/2 inch less than door width on pull side, by height scheduled or indicated. 0.050" thick by 10" high stainless steel. Fasten with exposed machine or self-tapping screws.
1. Material: Metal.
 - a. Manufacturers:

Door Hardware

- 1) Baldwin Hardware Corporation (BH).
 - 2) Ingersoll-Rand Company (Glynn-Johnson) (NTQ).
 - 3) Stanley Works (ST)
 - 4) Tri Brass Manufacturing Company, Inc.
 - 5) (Trimco and Builder's Brass
- B. Stops and Holders: Provide floor stops for doors, unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic.
1. Manufacturers:
 - 1) Baldwin Hardware Corporation (BH).
 - 2) Ingersoll-Rand Company (Glynn-Johnson) (NTQ).
 - 3) Stanley Works (ST)
 - 4) Tri Brass Manufacturing Company, Inc. (Trimco and Builder's Brass) (TBM).
- C. Silencers for Door Frames: Neoprene or rubber; fabricated for drilled-in application to frame.

2.8 CYLINDERS, KEYING, AND STRIKES

- A. Cylinders: Best Tumbler type, constructed from brass or bronze, stainless steel, or nickel to match existing District key system.
1. Manufacturers:
 - a. Same manufacturer as for locks and latches.
 2. Number of Pins : Seven.
 3. High-Security Grade: BHMA Grade 1A, listed and labeled as complying with UL 437 (Suffix A).
 4. Permanent Cores: Manufacturer's standard; finish face to match lockset; interchangeable cores.
 5. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.
 - a. Replace construction cores with permanent cores, directed by the State's Representative.
 - b. Furnish permanent cores to the State's Representative for installation.
- B. Keying System: Factory-registered keying system; to match existing Park Master key system (Best).

1. Keys: Provide nickel-silver keys permanently inscribed with a visual key control number and "DO NOT DUPLICATE" notation. In addition to one extra blank key for each lock, provide three change keys.
- C. Strikes: Manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set.

2.9 FABRICATION

- A. Base Metals: Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18 for finishes. Do not furnish manufacturer's standard materials if different from specified standard.
- B. Fasteners: Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated. Provide steel machine or wood screws or steel through bolts for fire-rated applications.
- C. Fasteners: Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
- D. Finishes: Comply with BHMA A156.18.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Examine doors and frames for compliance with requirements for installation tolerances, wall and floor construction, and other conditions affecting performance.
- B. Steel Door and Frame Preparation: Comply with DHI A115 series. Drill and tap doors and frames for surface-applied hardware according to SDI 107.
- C. Mounting Heights: Comply with the following requirements, unless otherwise indicated:
 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
- D. Adjust and reinforce attachment substrates as necessary for proper installation and operation. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

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Door Hardware

- E. Adjust door control devices to compensate for final operation to comply with accessibility requirements.

1. Door Closers: Adjust sweep period so that from an open position of 70 degrees, the door will take at least three seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.
2. Force to operate door shall not exceed 5 pounds.

3.2 FIELD QUALITY CONTROL

- A. Inspections: The State's Representative will inspect hardware for quality and proper function.

3.3 DOOR HARDWARE GROUPS

Group 1

(Office Rooms)

<u>No.</u>	<u>Description</u>	<u>Type</u>	<u>Manufacturer</u>	<u>Finish</u>
*	Hinges	FBB 191	(ST)	**
1	Passage Latch	AL10S	(S)	**
*	Number of hinges,	1 1/2 Pairs/Door		

** Finish of all hardware and fasteners to be satin stainless steel

Group 2

(Exterior Entrance door) unless otherwise noted

<u>No.</u>	<u>Description</u>	<u>Type</u>	<u>Manufacturer</u>	<u>Finish</u>
*	Hinges	FBB 191	(ST)	**
1	Lockset	D50PD SPA	(S)	**
1	Dead Bolt	B660	(S)	
1	Kick Plates	#K0050	(B)	**
1	Door Stop	#F823X	(B)	**
1	Hold Open Device			
*	Number of hinges,	1 1/2 Pairs/Door		

** Finish of all hardware and fasteners to be satin stainless steel

END OF SECTION 08711

SECTION 09202 ACOUSTICAL PLASTER

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Ceiling Spray On Acoustical Plaster.

1.2 SUBMITTALS

- A. Samples: Submit actual samples and technical data for spray on acoustical ceiling finishes.

1.3 QUALITY ASSURANCE

- A. Subcontractor qualification: Installer shall have successful experience spray on acoustical finish system

PART 2 - PRODUCTS

2.1 PRODUCT DELIVERY AND STORAGE

- A. Delivery of Materials: Deliver materials in original, unopened packages clearly labeled with manufacturer's name, item description, part number, type and class as applicable.

2.2 PRODUCTS

- A. Spray on Plaster: Coarse Aggregated Acoustical Plaster: thickness up to ½" on gypsum.

PART 3 - EXECUTION

3.1 INSPECTIONS

- A. Examine areas to receive materials for conditions which will adversely affect installation. Provide written report of unacceptable surface
- B. Do not start work until unsatisfactory conditions are corrected
- C. Verify work above ceiling is complete and installed in manner which will not affect layout and installation of suspension system components.
- D. Beginning of installation shall signify acceptance of conditions in areas to receive finish.

Section 09202 – Page 2
Acoustical Plaster

3.2 FINISHING

- A. Mixing: Per manufacturers written instructions
- B. Spray Application: - All pumps and hoses must be cleaned initially with water followed by approximately one gallon spray on material before application.
- C. Combined mixing/pumping units: Initially fill mixing hopper with necessary water to flush hoses. Pump all water from hopper, then drop joint compound into material reservoir of pump. Start pumping until compound feeds into hose. Immediately stop pump. Add water and powder in mixing hopper following mixing directions. When Acoustical Finish is properly mixed, pump out and discard joint compound. Turn on atomizing air, material valve and pump (in that order).
- D. Pumping units only: Add previously mixed finish to material hopper after pumping joint compound into hose. Then follow the start-up procedure as stated for combined mixing/pumping units.
- E. Recommended spray pattern is 1&1/2' to 3' in diameter. The spray gun should be held 2' to 4' from the surface, depending upon material density and atomizer pressure. Apply USG Acoustical Finish evenly, holding pole gun perpendicular to the surface being sprayed and slowly waving it from side to side until area is covered. Then immediately double back, crosshatching prior coat. Repeat same procedure as necessary until desired thickness is reached.
- F. Elimination of spray lines and section seams is essential in producing an acceptable finish. Do not spray a portion of a ceiling in one day and the final portion on another day as a noticeable seam will result. If entire ceiling area cannot be sprayed to the final thickness in one day, spray the entire surface with a material coat of uniform thickness (min. 1/4"). Complete to final thickness the following day using a cross-hatch application. Use natural breaks and boundaries to "frame" pattern edges and conceal seams. To measure average thickness, mark desired thickness on a blunt-tipped object (head of pencil or finishing nail) and insert into finish.
- G. Surface may receive flat, latex paint (white or pastel) and spray apply over dried finish. There will be a minimal loss in NRC value.

END OF SECTION 09202

SECTION 09260
GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Interior 5/8 inch Type "X" gypsum wallboard..
- B. Work shall consist of but is not limited to the following:
 - 1. Gypsum Board at interior locations.
 - 2. Taped and Sanded Joint Treatment.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.

1.3 QUALITY ASSURANCE

- A. Industry Standards: Perform gypsum wallboard systems work in accordance with recommendations of ASTM C754 and GA 216 "Application and Finishing of Gypsum Board" by Gypsum Association, except where more detailed or stringent requirements are indicated. Keep a copy of GA 216 in field office for the duration of this project.
- B. Allowable Tolerances: 1/8 inch offsets between planes of board faces and 1/4 inch in 8 feet for plumb, level, warp, and bow.
- C. Manufacturer: Obtain gypsum boards, trim accessories, adhesives, and joint treatment products from single manufacturer or from manufacturers recommended by prime manufacturer of gypsum board.

1.04 REFERENCES

- A. GA 216 – Recommended Specifications for the Application and Finishing of Gypsum Board.

PART 2 - PRODUCTS

2.1 PRODUCT DELIVERY AND STORAGE

- A. Gypsum board shall be delivered to job site just prior to intended use.

Section 09260 – Page 2
Gypsum Board Assemblies

- B. Store gypsum board inside under cover. Store board flat and off floor. Protect from damage. Neatly stack materials flat, taking care to avoid sagging or damage to board surfaces and edges.
- C. All gypsum board and accessories shall remain in their wrapping or containers until ready for use. Keep materials dry and fully protected from the weather.

2.2 PANEL PRODUCTS

- A. Panel Size, General: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.
- B. Gypsum Wallboard: ASTM C 36.
 - 1. Regular Type: In thickness indicated and with long edges tapered.

2.3 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 - 1. Cornerbead: Use at outside corners. Metal.
 - 2. Metal

2.4 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475.
- B. Joint Tape:
 - 1. Interior Gypsum Wallboard: Paper.
- C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Pre-filling: At open joints, beveled panel edges, and damaged surface areas, use setting-type taping compound.
 - 2. Embedding and First Coat: For embedding tape and first coat on joints, flanges of trim accessories, and fasteners, use setting-type taping compound.
 - a. Use setting-type compound for installing paper-faced metal trim accessories.
 - 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 - 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
 - 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

PART 3 - EXECUTION

3.1 PANEL PRODUCT INSTALLATION

- A. Gypsum Board: Comply with ASTM C 840 and GA-216.
 - 1. Space screws a maximum of 12 inches o.c. for vertical applications.
 - 2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
 - a. Stagger abutting end joints not less than one framing member in alternate courses of board.
 - 3. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.
 - 4. Laminating to Substrate: Comply with gypsum board manufacturer's written recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

3.2 TRIM INSTALLATION

- A. Install metal edge trim where Gypsum Board abuts any other material in an exposed location. In addition, install metal edge trim wherever Gypsum Board edge is free.

3.3 FINISHING

- A. Installing Trim Accessories: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Finishing Gypsum Board Panels: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for final finish.
 - 1. Pre-fill open joints, or beveled edges, and damaged surface areas.
 - 2. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.
- C. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:
 - 1. Level 5: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.

3.4 APPLYING TEXTURE FINISHES

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Gypsum Board Assemblies

- A. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings to prevent damage according to texture finish manufacturer's written recommendations.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns.
- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture finish manufacturer's written recommendations.

END OF SECTION 09260

SECTION 09652
SHEET VINYL FLOOR COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes sheet vinyl floor coverings, with and without backings and resilient wall base.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Samples for Verification: In manufacturer's standard size, but not less than 6-by-9-inch sections of each different color and pattern of floor covering required.

1.3 PROJECT CONDITIONS

- A. Maintain temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 85 deg F in spaces to receive floor tile during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. After post-installation period, maintain temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Close spaces to traffic during floor covering installation.
- D. Close spaces to traffic for 48 hours after floor covering installation.
- E. Install floor coverings after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 SHEET VINYL FLOOR COVERING

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- B. Products: Subject to compliance with requirements, provide one of following:
 - 1. Armstrong World Industries, Inc.; Canyon Creek Series, Lawson or Granite Bay Group .

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Sheet Vinyl Floor Coverings

- 2. Congoleum Corporation; Concept Series, Chesterfield Group.
- 3. Tarkett Inc.; Style Brite Series, Coachouse or Quadrant Group.

- C. Unbacked Sheet Vinyl Floor Covering: ASTM F 1913
- D. Sheet Vinyl Floor Covering With Backing: ASTM F 1303.
- E. Color and Pattern: As selected from manufacturer's indicated Series range.
- F. Sheet Width: As standard with manufacturer
- G. Seaming Method: Standard

2.2 RESILIENT WALL BASE

- A. Type (Material Requirement): vinyl
- B. Group (Manufacturing Method): solid, homogeneous
- C. Style: Cove (with top-set toe) at vinyl flooring Straight toeless at carpet floorings
- D. Minimum Thickness 0.125
- E. Height: indicated
- F. Lengths: manufacturers standard coil lengths
- G. Outside Corners: Premoleded
- H. Inside Corners: Premoleded
- I. Surface: Smooth.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic cement based formulation provided or approved by floor covering manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit sheet vinyl floor covering and substrate conditions indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of floor coverings.

- B. Concrete Substrates: Prepare according to ASTM F 710.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - 3. Moisture Testing:
 - a. Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
- C. Remove substrate coatings and other substances that are incompatible with floor covering adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
- D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.
- E. Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
 - 1. Do not install floor coverings until they are same temperature as space where they are to be installed.
- F. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Unroll sheet vinyl floor coverings and allow them to stabilize before cutting and fitting.
- B. Lay out sheet vinyl floor coverings as follows:
 - 1. Maintain uniformity of floor covering direction.
 - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in floor covering substrates.
 - 3. Match edges of floor coverings for color shading at seams.
 - 4. Avoid cross seams.
- C. Scribe and cut floor coverings to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, and thresholds.

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Sheet Vinyl Floor Coverings

- D. Extend floor coverings into toe spaces, door reveals, closets, and similar openings.
- E. Maintain reference markers, holes, or openings that are in place or marked for future cutting by repeating on floor coverings as marked on substrates. Use chalk or other nonpermanent marking device.
- F. Adhere floor coverings to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- G. Perform the following operations immediately after completing floor covering installation:
 - 1. Remove adhesive and other blemishes from floor covering surfaces.
 - 2. Sweep and vacuum floor coverings thoroughly.
 - 3. Damp-mop floor coverings to remove marks and soil.
 - a. Do not wash floor coverings until after time period recommended by manufacturer.
- H. Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

END OF SECTION 09652

SECTION 09681 CARPET TILE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes carpet tile and installation.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include the following:
 - 1. Existing floor materials to be removed.
 - 2. Existing floor materials to remain.
 - 3. Pattern of installation.
 - 4. Pattern type, location, and direction.
 - 5. Pile direction.
 - 6. Insets and borders.
 - 7. Transition and other accessory strips.
 - 8. Transition details to other flooring materials.
- C. Samples: Suitable for "heavy use, office environment" carpet tile and exposed accessory subject to Section 2.1 below.
- D. Product Schedule: Use same room and product designations indicated on Drawings and in schedules.
- E. Maintenance data.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.
- B. Mockups: Install mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution.
 - 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104, Section 5, "Storage and Handling."

Carpet Tile

1.5 PROJECT CONDITIONS

- A. General: Comply with CRI 104, Section 6.1, "Site Conditions; Temperature and Humidity."
- B. Environmental Limitations: Do not install carpet tile until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- C. Do not install carpet tile over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet tile, install carpet tile before installing these items.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace carpet tile that does not comply with requirements or that fails within 3 years from date of Substantial Completion.
 - 1. Warranty does not include deterioration or failure of carpet tile from unusual traffic, failure of substrate, vandalism, or abuse. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delaminating.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Carpet Tile: 25 Full-size units or 5% of the amount installed for each type.

PART 2 - PRODUCTS

2.1 CARPET TILE

- A. Available Products: As selected from manufacturer's full range for "office environment use and occupancy" and subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, review and approval of the following:
 - 1. The Dixie Group
 - 2. Templeton Carpet Mills

3. Syntec Industries, Inc
4. Royalty Carpet Mills
5. Mohawk Commercial Carpets
6. Carpeton Mills

- B. Fiber Content: 80% wool; 20% nylon
- C. Face Construction: Level pile.
- D. Gauge: ends per inch; submit for review.
- E. Stitches: per inch; submit for review.
- F. Pile Height: ½” for finished carpet tile per ASTM D 418.
- G. Surface Pile Weight ; submit for review.
- H. Total Weight; submit for review.
- I. Primary Backing; submit for review..
- J. Secondary Backing; submit for review.
- K. Critical Radiant Flux Classification: ASTM E 648.
- L. Color and Patter; submit for review

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with CRI 104, Section 13, "Carpet Modules (Tiles)."

END OF SECTION 09681

SECTION 09912 PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes surface preparation and field painting of exterior and interior items and surfaces.
- B. Definitions. The following definitions supercede all others:
 - 1. Exposed: In contact with the atmosphere, or with air, in the finished construction,
 - 2. Exposed to view: Visible from any point of view in the finished construction.
 - 3. Factory Finished: Glass, plastic, plastic laminate, chrome plating, polished metal, anodized metal, carpet and fabric are factory finished and, unless otherwise specified, shall not be painted.
 - 4. Ferrous: Containing iron.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.

1.3 PROJECT CONDITIONS

- A. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain storage containers in a clean condition, free of foreign materials and residue.
- B. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.
- C. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.
- D. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

Painting

1.4 EXTRA MATERIALS

- A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to State's Representative.

1. Quantity: Provide 1 gal. of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Semi Gloss Enamel Paint and Primers
 - a. Dunn-Edwards Paint Co. (Dunn-Edwards).
 - b. ICI Dulux Paint Centers (ICI Dulux Paints).
 - c. Sherwin-Williams Co. (Sherwin-Williams).

2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

2.3 PREPARATORY COATS

- A. Exterior Primer: Exterior alkyd primer of finish coat manufacturer and recommended in writing by manufacturer for use with finish coat and on substrate indicated.
1. Ferrous-Metal and Aluminum Substrates: Rust-inhibitive metal primer.
 2. Zinc-Coated Metal Substrates: Galvanized metal primer.

3. Where manufacturer does not recommend a separate primer formulation on substrate indicated, use paint specified for finish coat.

2.4 EXTERIOR AND INTERIOR WOOD FINISH COATS

A. Exterior Semigloss Acrylic Enamel:

1. Dunn-Edwards; Permasheen #W 901.
2. ICI Dulux Paints; 2406-XXXX Dulux Professional Exterior 100 Percent Acrylic Semi-Gloss Finish.
3. Sherwin-Williams; A-100 Latex Gloss A8 Series.

B. Sacrificial Anti-graffiti Coating:

1. Genesis Coatings, Inc. Graffiti Melt
2. Enviro Tech Engineering. DeFeatti
3. Or equal

2.5 DOORS, FRAMES, & VENT PIPES FINISH COATS

A. Exterior Semigloss Acrylic Enamel:

1. Dunn-Edwards; Permasheen #W 901.
2. ICI Dulux Paints; 2406-XXXX Dulux Professional Exterior 100 Percent Acrylic Semi-Gloss Finish.
3. Sherwin-Williams; A-100 Latex Gloss A8 Series.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with procedures specified in PDCA P4 for inspection and acceptance of surfaces to be painted.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
- C. Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.

Painting

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- D. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
1. Provide barrier coats over incompatible primers or remove and reprime.
 2. Cementitious Materials: Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
 3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.
 - a. 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 dried.
 4. Ferrous Metals without shop-applied coating: ; remove oil, grease, dirt, rust, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
 5. Ferrous Metals with shop-applied coating: remove oil, grease, dirt, rust, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
 6. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- E. Material Preparation:
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 3. Do not add solvent, thinners or extenders. Use coating materials as supplied from manufacturer's container.
- F. Exposed-to-View Surfaces: Include areas visible when permanent or built-in fixtures, grilles, convector covers, and similar components are in place. Extend

coatings in these areas, as required, to maintain system integrity and provide desired protection.

1. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 2. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 3. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
- G. Sand lightly between each succeeding enamel coat.
- H. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. Omit primer over metal surfaces that have been shop primed and touchup painted.
 2. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance.
- I. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
- J. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by manufacturer.
- K. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.
- L. Graffiti Coating: Apply graffiti coating to exterior siding at a rate to ensure complete coverage with pores filled.
- M. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- N. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

Painting

3.2 CLEANING AND PROTECTING

- A. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
- B. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by State Representative.
- C. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
 - 1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.3 EXTERIOR PAINT SCHEDULE

- A. All Wood and gypsum board:
 - 1. Primer and Two coats over new and existing wood.
 - a. Primer: Exterior alkyd primer
 - b. Finish coat: Exterior semigloss acrylic enamel.
 - 2. Sacrificial Graffiti Coating: Two coats.
 - a. First coat: Sacrificial Graffiti Coating.
 - b. Finish Coat: Sacrificial Graffiti Coating.
- B. Ferrous Metal:
 - 1. Acrylic Finish: Two finish coats over a rust-inhibitive primer.
 - a. Primer: Exterior ferrous-metal primer (not required on shop-primed items).
 - b. Finish Coats: Exterior semigloss acrylic enamel.
- C. Zinc-Coated Metal:
 - 1. Acrylic Finish: Two finish coats over a galvanized metal primer.
 - a. Primer: Exterior galvanized metal primer.
 - b. Finish Coats: Exterior semigloss acrylic enamel.

END OF SECTION 09912

SECTION 10200 LOUVERS AND VENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes fixed metal louvers

1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide louvers capable of withstanding the effects of gravity loads and wind loads based on a uniform pressure of 20 lb. per square foot. acting inward or outward, without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors.
- B. Thermal Movements: Provide louvers that allow for thermal movements resulting from a temperature change (range) of 120 deg F, ambient; 180 deg F, material surfaces, by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
- C. Air-Performance, Water-Penetration, and Wind-Driven Rain Ratings: As demonstrated by testing manufacturer's stock units according to AMCA 500-L.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. For louvers specified to bear AMCA seal, include printed catalog pages showing AMCA Certified Ratings Seals.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other Work.
 - 1. Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Louvers:
 - a. American Warming and Ventilating, Inc.
 - b. Arrow United Industries.
 - c. CopperCraft

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Louvers and Vents

- d. Construction Specialties, Inc.
- e. Dowco Products Group; Safe-Air of Illinois, Inc.
- f. Greenheck.
- g. Industrial Louvers, Inc.
- h. Louvers & Dampers, Inc.
- i. Metal Form Manufacturing Company, Inc.
- j. Mid American building Products, Inc
- k. NCA Manufacturing, Inc.
- l. Nystrom Building Products.
- m. Reliable Products; Hart & Cooley, Inc.
- n. Ruskin Company; Tomkins PLC.
- o. Vent Products Company, Inc.
- p. Or Equal Manufacturer's product

2.2 MATERIALS

- A. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 zinc coating, mill phosphatized.
- B. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel.
- C. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.3 FABRICATION, GENERAL

- A. Fabricate frames to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
- B. Join frame members to each other and to louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer, concealed from view.

2.4 FIXED, FORMED-METAL LOUVERS

- A. Horizontal, Drainable-Blade Louver
 - 1. Frame and Blade Material and Nominal Thickness: Galvanized steel sheet, not less than 0.052 inch for frames and 0.040 inch for blades
 - 2. Frame and Blade Material and Nominal Thickness: Stainless-steel sheet, but not less than 0.050 inch.
 - 3. Performance Requirements:
 - a. Free Area guideline: Not less than 8 sq. ft. for 48-inch- wide by 48-inch- high louver.

- b. Point of Beginning Water Penetration: Not less than 900 fpm
- c. Air Performance: Not more than 0.10-inch wg static pressure drop at 700 fpm free-area velocity.

2.5 LOUVER SCREENS

- A. General: Provide screen at interior face of each exterior louver.
- B. Louver Screen Frames: Same kind and form of metal as indicated for louver to which screens are attached.
- C. Louver Screening:
 - 1. Bird Screening: Galvanized steel, 1/2-inch- square mesh, 0.041-inch wire.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- D. Repair damaged finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.
- E. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

END OF SECTION 10200

SECTION 10400 IDENTIFYING DEVICES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Accessibility Signage: Provide all signage required by governing accessibility requirements, including but not limited to site access signage, parking stall signage, restroom signage, all the above including Braille. All signage shall be installed per governing accessibility regulations.
- B. Title 24 of the California Code of Regulations (T-24) and the Americans with Disabilities Act (ADA) signage.

1.02 SUBMITTALS

- A. Manufacturer's data: Submit data for letters and signs, showing letter style, finish and installation details.

PART 2 - PRODUCTS

2.01 TYPE

- A. Signs: Laminated colored plastic with wood backing and with adhesive attachment; core color contrasting to exterior face color; total laminate thickness 0.125 inch. Lettering engraved through face material to expose core.

2.02 RESTROOM SIGNAGE

- A. Manufactured by Tubular Specialties Manufacturing, Inc. (800) 225-5876, Best Manufacturing Sign Systems (800) 235-2378, or approved equal.
- B. Men's and Women's door sign: Circle (women's) 1/4" thick and 12" in diameter; equilateral triangle (men's) 1/4", with edges 12" long and vertex pointing upward.
- C. Color of Symbol: Submit full range of color selection for approval.
- D. ADA Room Identification Sign; 10.5" x 8" with raised letters, raised men-women figure, raised international symbol of accessibility, and Grade II Braille to be located on the latch - outside approach side of the door at 60" AFF and allowing approach within 3" of the sign at accessible restroom. Signs to read "RESTROOM".

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install signs after doors are painted and finished, in locations shown on the plans.
- B. Install signs at each location, centered and level, in line, in accordance with manufacturer's recommendations.
- C. Clean and polish, remove excess adhesive.

END OF SECTION 10400

SECTION 10436 POST AND PANEL SIGNS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Nonilluminated, single-sheet-type post and panel signs.

1.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide post and panel signs capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated, determined according to the current approved edition of the California Building Code:
 - 1. Wind Loads: Determine loads based on a uniform pressure of 40 pounds/square foot, acting in any direction.

1.3 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Include plans, elevations, and installation details.
- C. Samples: For each material, finish, and color.
 - 1. Include a sample of graphic-image process.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Andco Industries Corporation.
 - 2. APCO Graphics
 - 3. ASI Sign System, Inc.
 - 4. Best Manufacturing Co.
 - 5. Innerface Sign Systems, Inc.
 - 6. Kaltech Industries Group, Inc.
 - 7. Signature Signs, Inc.
 - 8. Supersine Company (The).
 - 9. Vomar Products, Inc.

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Post and Panel Signs

2.2 MATERIALS

- A. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of alloy 5005-H15.
- B. Steel Tubing: Cold-formed steel tubing complying with ASTM A 500, Grade B.
- C. Concrete for Postholes: Comply with requirements in Division 3 Section "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 2500 psi, unless otherwise indicated.

2.3 POSTS

- A. General: Fabricate posts to lengths required for mounting method indicated.
 - 1. Direct-Burial Method: Provide posts 36 inches longer than height of sign to permit direct embedment in concrete foundations.
 - 2. Baseplate Method: Provide posts with baseplates, flanges, or other fittings, welded to bottom of posts. Drill holes in baseplate for anchor-bolt connection.
 - a. Provide anchor bolts of size required for connecting posts to concrete foundations.
- B. Steel Posts: Fabricate from 0.120-inch-thick, square steel tubing. Include post caps, fillers, spacers, junction boxes, access panels, and related accessories required for complete installation. Hot-dip galvanize post assemblies after fabrication to comply with ASTM A 123/A 123M.
 - 1. Post Size: 2 inches square.
 - 2. Post Finish: Aluminum-Zinc Alloy-Coated Steel.

2.4 SIGN PANELS

- A. Unframed Single-Sheet Panels: Provide unframed single-sheet sign panels with edges mechanically and smoothly finished.
 - 1. Panel Material: 0.080-inch-thick aluminum sheet.
 - a. Panel Finish: Manufacturer's baked enamel standard semigloss color finish with UV inhibitors.
 - 2. Edge Condition: Rounded.

2.5 GRAPHICS

- A. Surface-Applied, Die-Cut Vinyl Copy: Provide die-cut characters from nonreflective vinyl film with pressure-sensitive adhesive backing. Apply copy to exposed face of sign panel.
- B. "Disabled Parking" signs: See plans for size with white symbol of accessibility on blue background.
- C. Notification Sign: The contractor will post a sign at site 5 days before start of construction. Sign will be at least 36" wide x 24" high with 1-1/2" tall letters stating:
 - 1. "PARKING LOT WILL BE CLOSED FROM (DATE) TO (DATE) FOR CONSTRUCTION".

2.6 ALUMINUM FINISHES

- A. Baked-Enamel Finish: Cleaned with inhibited chemicals; acid-chromate-fluoride-phosphate conversion coating; thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603, medium gloss.
 - 1. Color: As indicated on the drawings.

2.7 GALVANIZED STEEL FINISHES

- A. Surface Preparation: Clean surfaces of dirt, grease, and other contaminants. Clean welds, mechanical connections, and abraded areas and repair galvanizing according to ASTM A 780. Apply a conversion coating suited to the organic coating to be applied over it.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Excavation: In firm, undisturbed or compacted soil, drill or (using a post-hole digger) hand-excavate holes for each post to minimum diameter recommended by sign manufacturer, but at least four times the largest post cross-section.
 - 1. Excavate hole depths approximately 39 inches below finished grade.
- B. Setting Posts: Center and align posts in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Check for alignment and hold in position until concrete has achieved its initial set.
- C. Set anchor bolts and other embedded items required for installation. Use templates furnished by suppliers of items to be attached.

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Post and Panel Signs

- D. Install signs level, plumb, and at height indicated, with surfaces free from distortion.
- E. Unless otherwise directed by the Drawings, or the State's Representative, all regulatory and warning signs shall be installed with the bottom of the signs a minimum of 5 feet above roadway surface. All installations of posts and sign panels shall be in accordance with Section 56-2.02A of the CALTRANS Standard Specifications. The Contractor will be responsible for locating all underground utilities before digging.

END OF SECTION 10436

SECTION 10801
TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Toilet and bath accessories.

1.2 SUBMITTALS

- A. Product Data: For each product indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Products: The design for toilet and bath accessories described in Part 2 are based on products indicated. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
 - 1. Toilet and Bath Accessories:
 - a. Bobrick Washroom Equipment, Inc.
 - b. Bradley Corporation.
 - c. Or approved equal

2.2 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304, No. 4 finish (satin), 0.0312-inch minimum nominal thickness, unless otherwise indicated.
- B. Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- C. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- D. Fasteners: Screws, bolts, and other devices of same material as accessory unit, tamper and theft resistant when exposed, and of galvanized steel when concealed.

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Toilet and Bath Accessories

- E. Keys: Provide universal keys for internal access to accessories for servicing and re-supplying. Provide minimum of six keys to Owner's representative.

2.3 TOILET ACCESSORIES

- A. Toilet Tissue Dispenser: Two at each water closet
 - 1. Basis-of-Design Product: Bobrick, B-2740
 - 2. Type: single dispenser.
- B. Seat Cover dispenser:
 - 1. Basis-of-Design Product: Bobrick B-221
 - 2. Mounting: Surface.
 - 3. Material: Stainless steel Satin finish.
 - 4. Cabinet: Welded construction. Equipped with tumbler lock.
- C. Grab Bars: One set
 - 1. Basis-of-Design Product: Bobrick, 6806 Series, 6806 x 48 side, 6806 x 36 rear
 - 2. Material: Stainless steel, 0.05 inch thick.
 - 3. Mounting: Concealed.
 - 4. Gripping Surfaces: Smooth, satin finish
 - 5. Outside Diameter: 1-1/2 inches for heavy-duty applications.
 - 6.
- D. Mirror Unit: One in each toilet room
 - 1. Basis-of-Design Product: Bobrick B-165 1836
 - 2. Frame: Stainless-steel channel.
- E. Robe Hook: As shown on drawings
 - 1. Basis-of-Design Product: Bobrick B-671
 - 2. Single-Prong Unit: Stainless-steel, single-prong robe hook with rectangular wall bracket and back plate for concealed mounting.
- F. Under lavatory Guard:
 - 1. Insulating Piping Coverings: White, antimicrobial, molded-vinyl covering for supply and drain piping assemblies intended for use at accessible lavatories to prevent direct contact with and burns from piping. Provide components as required for applications indicated with flip tops at valves that allow service access without removing coverings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install accessories using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
 - 1. Install grab bars to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.
- B. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective items. Remove temporary labels and protective coatings.

END OF SECTION 10801

SECTION 15050
BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Dielectric fittings.
3. Mechanical sleeve seals.
4. Sleeves.
5. Escutcheons.
6. Grout.
7. Mechanical demolition.
8. Equipment installation requirements common to equipment sections.
9. Concrete bases.
10. Supports and anchorages.

1.2 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspace, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

1.3 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and

Basic Mechanical Materials and Methods

conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

PART 2 - PRODUCTS

2.1 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 15 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.2 JOINING MATERIALS

- A. Refer to individual Division 15 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
- C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- D. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- E. Brazing Filler Metals: AWS A5.8, BCuP Series or BAg1, unless otherwise indicated.
- F. Welding Filler Metals: Comply with AWS D10.12.
- G. Solvent Cements for Joining Plastic Piping:
 - 1. ABS Piping: ASTM D 2235.
 - 2. CPVC Piping: ASTM F 493.
 - 3. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 - 4. PVC to ABS Piping Transition: ASTM D 3138.

2.3 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.

- D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.
- E. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
- F. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F.

2.4 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
- B. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
- C. Pressure Plates: Carbon steel. Include two for each sealing element.
- D. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.5 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
 - 1. Underdeck Clamp: Clamping ring with set screws.
- E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.
- F. PVC Pipe: ASTM D 1785, Schedule 40.
- G. Molded PE: Reusable, PE, tapered-cup shaped, and smooth-outer surface with nailing flange for attaching to wooden forms.

2.6 ESCUTCHEONS

Basic Mechanical Materials and Methods

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 - 1. Finish: Polished chrome-plated.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
 - 1. Finish: Polished chrome-plated

2.7 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi, 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 15 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors.
- M. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
- N. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 - 1. Install steel pipe for sleeves smaller than 6 inches in diameter.
 - 2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
 - 3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- O. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
 - 1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- P. Verify final equipment locations for roughing-in.
- Q. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.2 PIPING JOINT CONSTRUCTION

Basic Mechanical Materials and Methods

- A. Join pipe and fittings according to the following requirements and Division 15 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402, for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
 - 3. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
 - 4. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-

schedule-number PVC pipe and socket fittings according to ASTM D 2855.

5. PVC Nonpressure Piping: Join according to ASTM D 2855.
6. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.

- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- K. Plastic Nonpressure Piping Gasketed Joints: Join according to ASTM D 3212.
- L. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
 1. Plain-End Pipe and Fittings: Use butt fusion.
 2. Plain-End Pipe and Socket Fittings: Use socket fusion.
- M. Fiberglass Bonded Joints: Prepare pipe ends and fittings, apply adhesive, and join according to pipe manufacturer's written instructions.

3.3 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
 2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

3.5 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
 - 1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
 - 2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
 - 3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
 - 4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - 5. Install anchor bolts to elevations required for proper attachment to supported equipment.
 - 6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
 - 7. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 3 Section 03300 Cast-in-Place Concrete.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 5 Section 05500 "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.7 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor mechanical materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.8 GROUTING

- A. Mix and install grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors.

- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

END OF SECTION 15050

SECTION 15060 HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes hangers and supports for mechanical system piping and equipment.
- B. See Division 15 Section 15071 "Mechanical Vibration and Seismic Controls" for vibration isolation supports and hangers and seismic restraints.

1.2 PERFORMANCE REQUIREMENTS

- A. Design channel support systems for piping to support multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.
- B. Design heavy-duty steel trapezes for piping to support multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.
- C. Design seismic-restraint hangers and supports for piping and equipment.
- D. Design and obtain approval from authorities having jurisdiction for seismic-restraint hangers and supports for piping and equipment.

1.3 SUBMITTALS

- A. Product Data: For each type of pipe hanger, channel support system component, and thermal-hanger shield insert indicated.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer for multiple piping supports and trapeze hangers. Include design calculations and indicate size and characteristics of components and fabrication details.

1.4 QUALITY ASSURANCE

- A. Engineering Responsibility: Design and preparation of Shop Drawings and calculations for each multiple pipe support and seismic restraint by a qualified professional engineer.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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Hangers and Supports

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 MANUFACTURED UNITS

- A. Pipe Hangers, Supports, and Components: MSS SP-58, factory-fabricated components.
 - 1. Manufacturers:
 - a. AAA Technology and Specialties Co., Inc.
 - b. B-Line Systems, Inc.
 - c. Carpenter & Patterson, Inc.
 - d. Empire Tool & Manufacturing Co., Inc.
 - e. Globe Pipe Hanger Products, Inc.
 - f. Grinnell Corp.
 - g. GS Metals Corp.
 - h. Michigan Hanger Co., Inc.
 - i. National Pipe Hanger Corp.
 - j. PHD Manufacturing, Inc.
 - k. PHS Industries, Inc.
 - l. Piping Technology & Products, Inc.
 - 2. Galvanized, Metallic Coatings: For piping and equipment that will not have field-applied finish.
 - 3. Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- B. Channel Support Systems: MFMA-2, factory-fabricated components for field assembly.
 - 1. Manufacturers:
 - a. B-Line Systems, Inc.
 - b. Grinnell Corp.
 - c. GS Metals Corp.
 - d. Michigan Hanger Co., Inc.
 - e. National Pipe Hanger Corp.
 - f. Thomas & Betts Corp.
 - g. Unistrut Corp.
 - h. Wesanco, Inc.

2. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.
3. Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.

2.3 MISCELLANEOUS MATERIALS

- A. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Specific hanger requirements are specified in Sections specifying equipment and systems.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Specification Sections.
- C. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
 1. Adjustable Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F pipes, NPS 4 to NPS 16, requiring up to 4 inches of insulation.
 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24, requiring clamp flexibility and up to 4 inches of insulation.
 4. Adjustable Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
 5. U-Bolts (MSS Type 24): For support of heavy pipe, NPS 1/2 to NPS 30.
 6. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.
 7. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from 2 rods if longitudinal movement caused by expansion and contraction might occur.
 8. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42, if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
- D. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.

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Hangers and Supports

2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.
- E. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
1. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
 2. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
 3. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.

3.2 INSTALLATION

- A. Pipe Hanger and Support Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Channel Support System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled channel systems. Field assemble and install according to manufacturer's written instructions.
- C. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- D. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure above or to support equipment above floor. Place grout under supports for equipment and make smooth bearing surface.

3.4 ADJUSTING

- A. Hanger Adjustment: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.5 PAINTING

- A. Touching Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces. Apply paint by brush or spray to provide a

minimum dry film thickness of 2.0 mils. See Division 9 Section 09910 for paint materials and application requirements.

- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 15060

SECTION 15071
MECHANICAL VIBRATION AND SEISMIC CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Spring hangers with vertical-limit stops.
- B. Definitions:
 - 1. A_v : Effective peak velocity related acceleration coefficient.

1.2 SUBMITTALS

- A. Product Data: Include load deflection curves for each vibration isolation device indicated.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Include the following:
 - 1. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
 - 2. Riser Supports: Include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on building structure, spring deflection changes, and seismic loads. Include certification that riser system has been examined for excessive stress and that none will exist.
 - 3. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails, base weights, equipment static loads, power transmission, component misalignment, and cantilever loads.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 VIBRATION ISOLATORS

Mechanical Vibration and Seismic Controls

- A. Manufacturers:
 - 1. B-Line Systems, Inc.
 - 2. Or engineer approved equal.
- B. Spring Hangers with Vertical-Limit Stop: Combination coil-spring and elastomeric-insert hanger with spring and insert in compression and with a vertical-limit stop.
 - 1. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
 - 2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
 - 3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
 - 4. Lateral Stiffness: More than 80 percent of the rated vertical stiffness.
 - 5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
 - 6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
 - 7. Adjustable Vertical Stop: Steel washer with neoprene washer "up-stop" on lower threaded rod.

2.3 SEISMIC-RESTRAINT DEVICES

- A. Manufacturers:
 - 1. B-Line Systems, Inc.
 - 2. Or engineer approved equal.
- B. Resilient Isolation Washers and Bushings: 1-piece, molded, bridge-bearing neoprene complying with AASHTO M 251 and having a durometer of 50, plus or minus 5, with a flat washer face.
- C. Restraining Cables: Galvanized steel aircraft cables with end connections made of steel assemblies that swivel to final installation angle and utilize two clamping bolts for cable engagement.
- D. Anchor Bolts: Seismic-rated, drill-in, and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488/E 488M.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install equipment supports and roof penetrations as specified in Division 7 Section 07720.

- B. Install thrust limits at centerline of thrust, symmetrical on either side of equipment.
- C. Install restraining cables at each trapeze and individual pipe hanger. At trapeze anchor locations, shackle piping to trapeze. Install cables so they do not bend across sharp edges of adjacent equipment or building structure.
- D. Install steel angles or channel, sized to prevent buckling, clamped with ductile-iron clamps to hanger rods for trapeze and individual pipe hangers. At trapeze anchor locations, shackle piping to trapeze. Requirements apply equally to hanging equipment. Do not weld angles to rods.
- E. Install resilient bolt isolation washers on equipment anchor bolts.

3.2 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Inspect isolator seismic-restraint clearance.
 - 2. Test isolator deflection.

3.3 ADJUSTING

- A. Adjust isolators after piping systems have been filled and equipment is at operating weight.
- B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
- C. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop.
- D. Adjust active height of spring isolators.
- E. Adjust seismic restraints to permit free movement of equipment within normal mode of operation.
- F. Torque anchor bolts according to equipment manufacturer's written recommendations to resist seismic forces.

END OF SECTION 15071

SECTION 15075 MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following mechanical identification materials and their installation:
 - 1. Equipment nameplates.
 - 2. Pipe markers.
 - 3. Duct markers.
 - 4. Valve tags.

1.2 SUBMITTALS

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

1.3 QUALITY ASSURANCE

- A. ASME Compliance: Comply with ASME A13.1, "Scheme for the Identification of Piping Systems," for letter size, length of color field, colors, and viewing angles of identification devices for piping.

PART 2 - PRODUCTS

2.1 EQUIPMENT IDENTIFICATION DEVICES

- A. Equipment Nameplates: Metal, with data engraved or stamped, for permanent attachment on equipment.
 - 1. Data:
 - a. Manufacturer, product name, model number, and serial number.
 - b. Capacity, operating and power characteristics, and essential data.
 - c. Labels of tested compliances.
 - 2. Location: Accessible and visible.
 - 3. Fasteners: As required to mount on equipment.

2.2 PIPING IDENTIFICATION DEVICES

- A. Manufactured Pipe Markers, General: Preprinted, color-coded, with lettering indicating service, and showing direction of flow.
 - 1. Colors: Comply with ASME A13.1, unless otherwise indicated.

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Mechanical Identification

2. Lettering: Use piping system terms indicated and abbreviate only as necessary for each application length.
 3. Pipes with OD, Including Insulation, Less Than 6 Inches: Full-band pipe markers extending 360 degrees around pipe at each location.
 4. Pipes with OD, Including Insulation, 6 Inches and Larger: Either full-band or strip-type pipe markers at least three times letter height and of length required for label.
 5. Arrows: Integral with piping system service lettering to accommodate both directions; or as separate unit on each pipe marker to indicate direction of flow.
- B. Self-Adhesive Pipe Markers: Plastic with pressure-sensitive, permanent-type, self-adhesive back.
- C. Plastic Tape: Continuously printed, vinyl tape at least 3 mils thick with pressure-sensitive, permanent-type, self-adhesive back.
1. Width for Markers on Pipes with OD, Including Insulation, Less Than 6 Inches: 3/4 inch minimum.
 2. Width for Markers on Pipes with OD, Including Insulation, 6 Inches or Larger: 1-1/2 inches minimum.

2.3 DUCT IDENTIFICATION DEVICES

- A. Duct Markers: Engraved, color-coded laminated plastic. Include direction and quantity of airflow and duct service (such as supply, return, and exhaust). Include contact-type, permanent adhesive.

2.4 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers, with numbering scheme. Provide 5/32-inch hole for fastener.
1. Material: 0.032-inch- thick brass.
 2. Valve-Tag Fasteners: Brass wire-link chain.

PART 3 - EXECUTION

3.1 APPLICATIONS, GENERAL

- A. Products specified are for applications referenced in other Division 15 Sections. If more than single-type material, device, or label is specified for listed applications, selection is Installer's option.

3.2 EQUIPMENT IDENTIFICATION

- A. Install and permanently fasten equipment nameplates on each major item of mechanical equipment that does not have nameplate or has nameplate that is damaged or located where not easily visible. Locate nameplates where accessible and visible. Include nameplates for the following general categories of equipment:
1. Fuel-burning units including furnaces.
 2. Condensers and similar motor-driven units.
 3. Coils and similar equipment.
 4. Fans, blowers, primary balancing dampers, and mixing boxes.
- B. Install equipment signs with screws or permanent adhesive on or near each major item of mechanical equipment. Locate signs where accessible and visible.
1. Identify mechanical equipment with equipment markers in the following color codes:
 - a. Green: For cooling equipment and components.
 - b. Yellow: For heating equipment and components.
 - c. Orange: For combination cooling and heating equipment and components.
 2. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
 3. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.

3.3 PIPING IDENTIFICATION

- A. Install manufactured pipe markers indicating service on each piping system. Install with flow indication arrows showing direction of flow.
1. Pipes with OD, Including Insulation, Less Than 6 Inches: Pretensioned pipe markers. Use size to ensure a tight fit.
 2. Pipes with OD, Including Insulation, Less Than 6 Inches: Self-adhesive pipe markers. Use color-coded, self-adhesive plastic tape, 1-1/2 inches wide, lapped at least 1-1/2 inches at both ends of pipe marker, and covering full circumference of pipe.
 3. Pipes with OD, Including Insulation, 6 Inches and Larger: Shaped pipe markers. Use size to match pipe and secure with fasteners.
 4. Pipes with OD, Including Insulation, 6 Inches and Larger: Self-adhesive pipe markers. Use color-coded, self-adhesive plastic tape, at least 1-1/2

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inches wide, lapped at least 3 inches at both ends of pipe marker, and covering full circumference of pipe.

- B. Locate pipe markers and color bands where piping is exposed in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior nonconcealed locations as follows:
 - 1. Near each valve and control device.
 - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
 - 3. Near penetrations through walls, floors, ceilings, and nonaccessible enclosures.
 - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 5. Near major equipment items and other points of origination and termination.
 - 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
 - 7. On piping above removable acoustical ceilings. Omit intermediately spaced markers.

3.4 DUCT IDENTIFICATION

- A. Install duct markers with permanent adhesive on air ducts in the following color codes:
 - 1. Green: For cold-air supply ducts.
 - 2. Yellow: For hot-air supply ducts.
 - 3. Blue: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
 - 4. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- B. Locate markers near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

3.5 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; plumbing fixture supply stops; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following:

1. Valve-Tag Size and Shape:
 - a. Cold Water: 1-1/2 inches, round.
 - b. Hot Water: 1-1/2 inches, round.
 - c. Gas: 1-1/2 inches, round.
2. Valve-Tag Color:
 - a. Cold Water: Blue.
 - b. Hot Water: Red.
 - c. Gas: Green.
3. Letter Color:
 - a. Cold Water: White.
 - b. Hot Water: White.
 - c. Gas: White.

3.6 ADJUSTING AND CLEANING

- A. Relocate mechanical identification materials and devices that have become visually blocked by other work.
- B. Clean faces of mechanical identification devices and glass frames of valve schedules.

END OF SECTION 15075

SECTION 15081 DUCT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes semirigid and flexible duct, insulating cements, field-applied jackets, AND accessories and attachments.

1.2 SUBMITTALS

- A. Product Data: Thermal conductivity, thickness, and jackets (both factory and field applied, if any), for each type of product indicated.
- B. Shop Drawings: Shop fabrication and installation details for the following:
 - 1. Removable insulation sections at access panels.
 - 2. Application of field-applied jackets.
 - 3. Applications at linkages for control devices.

1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide products with flame-spread and smoke-developed indices of 25 and 50, respectively, according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Mineral-Fiber Insulation:
 - a. CertainTeed Manson.
 - b. Knauf FiberGlass GmbH.
 - c. Owens-Corning Fiberglas Corp.
 - d. Schuller International, Inc.
 - 2. Flexible Elastomeric Thermal Insulation:
 - a. Armstrong World Industries, Inc.

- b. Rubatex Corp.

2.2 INSULATION MATERIALS

- A. Mineral-Fiber Board Thermal Insulation: Glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IB, without facing and with all-service jacket manufactured from kraft paper, reinforcing scrim, aluminum foil, and vinyl film.
- B. Mineral-Fiber Blanket Thermal Insulation: Glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II, without facing and with all-service jacket manufactured from kraft paper, reinforcing scrim, aluminum foil, and vinyl film.
- C. Flexible Elastomeric Thermal Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type II for sheet materials.
 - 1. Adhesive: As recommended by insulation material manufacturer.
 - 2. Ultraviolet-Protective Coating: As recommended by insulation manufacturer.
- D. Field-Applied Jackets: ASTM C 921, Type 1, unless otherwise indicated.
 - 1. Foil and Paper Jacket: Laminated, glass-fiber-reinforced, flame-retardant kraft paper and aluminum foil.
 - 2. PVC Jacket: High-impact, ultraviolet-resistant PVC; 20 mils thick; roll stock ready for shop or field cutting and forming.
- E. Accessories and Attachments:
 - 1. Glass Cloth and Tape: Comply with MIL-C-20079H, Type I for cloth and Type II for tape. Woven glass-fiber fabrics, plain weave, presized a minimum of 8 oz./sq. yd..
 - 2. Bands: Aluminum 3/4 inch wide.
 - 3. Wire: 0.080-inch, nickel-copper alloy; 0.062-inch, soft-annealed, stainless steel; or 0.062-inch, soft-annealed, galvanized steel.
 - 4. Weld-Attached Anchor Pins and Washers: Copper-coated steel pin for capacitor-discharge welding and galvanized speed washer. Pin length sufficient for insulation thickness indicated.
 - 5. Adhesive-Attached Anchor Pins and Speed Washers: Galvanized steel plate, pin, and washer manufactured for attachment to duct and plenum with adhesive. Pin length sufficient for insulation thickness indicated.

PART 3 - EXECUTION

3.1 GENERAL APPLICATION REQUIREMENTS

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; and free of voids throughout the length of ducts and fittings.
- C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.
- E. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.
- F. Apply insulation with the least number of joints practical.
- G. Apply insulation over fittings and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
- H. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic. Apply insulation continuously through hangers and around anchor attachments.
- I. Insulation Terminations: For insulation application where vapor retarders are indicated, seal ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.
- J. Roof Penetrations: Apply insulation for interior applications to a point even with top of roof flashing.
- K. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and partitions, except fire-rated walls and partitions.
- L. Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire/smoke damper sleeves for fire-rated wall and partition penetrations.
- M. Floor Penetrations: Terminate insulation at underside of floor assembly and at floor support at top of floor.

3.2 DUCT AND PLENUM APPLICATION SCHEDULE

- A. Service: Round, supply-air, return-air, and outside-air ducts, concealed.
 - 1. Material: Mineral-fiber blanket.

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Duct Insulation

2. Thickness: 1 inch.
 3. Number of Layers: One.
 4. Field-Applied Jacket: Foil and paper.
 5. Vapor Retarder Required: No.
- B. Service: Rectangular, supply-air, return-air, and outside-air ducts, concealed.
1. Material: Mineral-fiber blanket.
 2. Thickness: 1 inch.
 3. Number of Layers: One.
 4. Field-Applied Jacket: Foil and paper.
 5. Vapor Retarder Required: No.
- C. Service: Round, supply-air, return-air, and outside-air ducts, exposed.
1. Material: Mineral-fiber blanket.
 2. Thickness: 1 inch.
 3. Number of Layers: One.
 4. Field-Applied Jacket: Foil and paper.
 5. Vapor Retarder Required: No.
- D. Service: Rectangular, supply-air, return-air, and outside-air ducts, exposed.
1. Material: Mineral-fiber blanket.
 2. Thickness: 1 inch.
 3. Number of Layers: One.
 4. Field-Applied Jacket: Foil and paper.
 5. Vapor Retarder Required: No.

END OF SECTION 15081

SECTION 15083 PIPE INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes semirigid and flexible piping insulation, insulating cements, field-applied jackets, accessories and attachments, and sealing compounds.

1.2 SUBMITTALS

- A. Product Data: Thermal conductivity, thickness, and jackets (both factory and field applied, if any), for each type of product indicated.
- B. Shop Drawings: Shop fabrication and installation details for the following:
 - 1. Application of protective shields, saddles, and inserts at pipe hangers for each type of insulation and hanger.
 - 2. Attachment and covering of heat trace inside insulation.
 - 3. Insulation application at pipe expansion joints for each type of insulation.
 - 4. Insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
 - 5. Removable insulation at piping specialties and equipment connections.
 - 6. Application of field-applied jackets.

1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Provide products with flame-spread and smoke-developed indices of 25 and 50, respectively, according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Mineral-Fiber Insulation:
 - a. CertainTeed Manson.
 - b. Knauf FiberGlass GmbH.

Pipe Insulation

- c. Owens-Corning Fiberglas Corp.
 - d. Schuller International, Inc.
- 2. Flexible Elastomeric Thermal Insulation:
 - a. Armstrong World Industries, Inc.
 - b. Rubatex Corp.
- 3. Polyolefin Insulation:
 - a. Armstrong World Industries, Inc.
 - b. IMCOA.
- 4. Closed-Cell Phenolic-Foam Insulation:
 - a. Kooltherm Insulation Products, Ltd.

2.2 PIPE INSULATION MATERIALS

- A. Mineral-Fiber Insulation: Glass fibers bonded with a thermosetting resin complying with the following:
 - 1. Preformed Pipe Insulation: Comply with ASTM C 547, Type 1, with factory-applied, all-purpose, vapor-retarder jacket.
 - 2. Blanket Insulation: Comply with ASTM C 553, Type II, without facing.
 - 3. Fire-Resistant Adhesive: Comply with MIL-A-3316C Class 1, Grade A for bonding glass cloth and tape to unfaced glass-fiber insulation, for sealing edges of glass-fiber insulation, and for bonding lagging cloth to unfaced glass-fiber insulation.
 - 4. Vapor-Retarder Mastics: Fire- and water-resistant, vapor-retarder mastic for indoor applications. Comply with MIL-C-19565C, Type II.
 - 5. Mineral-Fiber Insulating Cements: Comply with ASTM C 195.
 - 6. Expanded or Exfoliated Vermiculite Insulating Cements: Comply with ASTM C 196.
 - 7. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449/C 449M.
- B. Flexible Elastomeric Thermal Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
- C. Polyolefin Insulation: Unicellular polyethylene thermal plastic, preformed pipe insulation. Comply with ASTM C 534, Type I, except for density.
- D. Field-Applied Jackets: ASTM C 921, Type 1, unless otherwise indicated.
 - 1. Foil and Paper Jacket: Laminated, glass-fiber-reinforced, flame-retardant kraft paper and aluminum foil.

2. PVC Jacket: High-impact, ultraviolet-resistant PVC; 20 mils thick; roll stock ready for shop or field cutting and forming.
3. Standard PVC Fitting Covers: Factory-fabricated fitting covers manufactured from 20-mil- thick, high-impact, ultraviolet-resistant PVC.

E. Accessories and Attachments:

1. Glass Cloth and Tape: Comply with MIL-C-20079H, Type I for cloth and Type II for tape. Woven glass-fiber fabrics, plain weave, presized a minimum of 8 oz./sq. yd..
2. Bands: 3/4 inch wide aluminum.
3. Wire: 0.080-inch, nickel-copper alloy; 0.062-inch, soft-annealed, stainless steel; or 0.062-inch, soft-annealed, galvanized steel.

PART 3 - EXECUTION

3.1 GENERAL APPLICATION REQUIREMENTS

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; and free of voids throughout the length of ducts and fittings.
- C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Seal joints and seams with vapor-retarder mastic on insulation indicated to receive a vapor retarder.
- E. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.
- F. Apply insulation with the least number of joints practical.
- G. Apply insulation over fittings and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
- H. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic. Apply insulation continuously through hangers and around anchor attachments.
- I. Insulation Terminations: For insulation application where vapor retarders are indicated, seal ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.

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- J. Roof Penetrations: Apply insulation for interior applications to a point even with top of roof flashing.
- K. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and partitions, except fire-rated walls and partitions.
- L. Floor Penetrations: Terminate insulation at underside of floor assembly and at floor support at top of floor.

3.2 PIPE INSULATION APPLICATION SCHEDULE

A. Service: Domestic cold water.

- 1. Operating Temperature: 35 to 60 deg F.
- 2. Insulation Material: Mineral-fiber preformed pipe.
- 3. Insulation Thickness: Apply the following insulation thicknesses:
 - a. Domestic Cold Water Pipe: 1inch thick insulation.
- 4. Vapor Retarder Required: Yes.

B. Service: Domestic hot and recirculated hot water.

- 1. Operating Temperature: 60 to 140 deg F.
- 2. Insulation Material: Mineral fiber.
- 3. Insulation Thickness: 1inch.
- 4. Field-Applied Jacket: Foil and paper.

END OF SECTION 15083

SECTION 15140 DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes domestic water piping from locations indicated to fixtures and equipment inside the building.

1.2 SUBMITTALS

- A. Water Samples: Specified in "Cleaning" Article in Part 3.
- B. Field quality-control test reports.

1.3 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with 2007 CMC for domestic water piping.
- C. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic, potable domestic water piping and components.
- D. Retain below for all potable-water piping.
- E. Comply with NSF 61, "Drinking Water System Components-Health Effects; Sections 1 through 9," for potable domestic water piping and components.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Transition Couplings: Coupling or other manufactured fitting the same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.
- B. Steel Pipe: ASTM A 53, Type E or S, Grade A or B, Schedule 40, galvanized. Include ends matching joining method.
 - 1. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53 or ASTM A 106, Schedule 40, galvanized, seamless steel pipe. Include ends matching joining method.
 - 2. Malleable-Iron Unions: ASME B16.39, Class 150, hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface, and female threaded ends.

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3. Gray-Iron, Threaded Fittings: ASME B16.4, Class 125, galvanized, standard pattern.
 - C. Soft Copper Tube: ASTM B 88, Types K and L, water tube, annealed temper.
 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.
 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.
 - D. Hard Copper Tube: ASTM B 88, Types L and M, water tube, drawn temper.
 1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end. Furnish Class 300 flanges if required to match piping.
 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.
 - E. CPVC Schedule 40 Pipe: ASTM F 441/F 441M.
 1. CPVC Schedule 40 Fittings: ASTM F 438, socket type.
 - F. CPVC Schedule 80 Pipe: ASTM F 441/F 441M.
 1. CPVC Schedule 80 Fittings: ASTM F 439, socket type.
 - G. CPVC Piping System: ASTM D 2846/D 2846M, SDR 11, pipe and socket fittings.
 - H. CPVC Tubing System: ASTM D 2846/D 2846M, SDR 11, tube and socket fittings.
- 2.2 VALVES
- A. One-Piece, Copper-Alloy Ball Valves: Brass or bronze body with chrome-plated bronze ball, PTFE or TFE seats, and 400-psig minimum CWP rating.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.
- B. Flanges may be used on aboveground piping, unless otherwise indicated.
- C. Domestic Water Piping: Use the following piping materials for each size range:
 - 1. NPS 1-1/2 and Smaller: Hard copper tube, Type L; copper pressure fittings; and soldered joints.
 - 2. NPS 1-1/2 and Smaller: ASTM F 441/F 441M, CPVC, Schedule 80 pipe; CPVC, Schedule 80 threaded fittings; and threaded joints.
 - 3. NPS 1-1/2 and Smaller: ASTM F 441/F 441M, CPVC, Schedule 80 pipe; CPVC, Schedule 80 socket fittings; and solvent-cemented joints.
 - 4. NPS 1-1/2 and Smaller: CPVC piping system for NPS 1-1/2; CPVC tubing system for NPS 1-1/4 and smaller; and solvent-cemented joints.
 - 5. NPS 1-1/2 and Smaller: CPVC tubing system and solvent-cemented joints.
 - 6. NPS 2: Hard copper tube, Type L; copper pressure fittings; and soldered joints.
 - 7. NPS 2: Hard copper tube, Type L with grooved ends; copper grooved-end fittings; copper-tubing, keyed couplings; and grooved joints.
 - 8. NPS 2: CPVC, Schedule 80 pipe; CPVC, Schedule 80 threaded fittings; and threaded joints.
 - 9. NPS 2: CPVC, Schedule 40 pipe; CPVC, Schedule 40 socket fittings; and solvent-cemented joints.
 - 10. NPS 2: CPVC piping system and solvent-cemented joints.
 - 11. NPS 2-1/2 to NPS 3-1/2: Hard copper tube, Type L; copper pressure fittings; and soldered joints.
 - 12. NPS 2-1/2 to NPS 3-1/2: CPVC, Schedule 80 pipe; CPVC, Schedule 80 threaded fittings; and threaded joints.
 - 13. NPS 2-1/2 to NPS 3-1/2: CPVC, Schedule 40 pipe; CPVC, Schedule 40 socket fittings; and solvent-cemented joints.
 - 14. NPS 4 to NPS 6: Steel pipe; gray-iron, threaded fittings; and threaded joints.
 - 15. NPS 4 to NPS 6: Hard copper tube, Type L; copper pressure fittings; and soldered joints.
 - 16. NPS 4 to NPS 6: CPVC, Schedule 80 pipe; CPVC, Schedule 80 threaded fittings; and threaded joints.
 - 17. NPS 4 to NPS 6: CPVC, Schedule 40 pipe; CPVC, Schedule 40 socket fittings; and solvent-cemented joints.

3.2 VALVE APPLICATIONS

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

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1. Shutoff Duty: Use bronze ball or gate valves for piping NPS 2 and smaller. Use cast-iron butterfly or gate valves with flanged ends for piping NPS 2-1/2 and larger.
2. Throttling Duty: Use bronze ball or globe valves for piping NPS 2 and smaller. Use cast-iron butterfly valves with flanged ends for piping NPS 2-1/2 and larger.
3. Hot-Water-Piping, Balancing Duty: Calibrated balancing valves.
4. Drain Duty: Hose-end drain valves.

B. CPVC ball, butterfly, and check valves may be used with CPVC piping.

3.3 PIPING INSTALLATION

- A. Refer to Division 15 Section 15050 "Basic Mechanical Materials and Methods" for basic piping installation.
- B. Install shutoff valve, inside building at each domestic water service.
- C. Install domestic water piping level with 0.25 percent slope downward toward drain.
- D. Fill water piping. Check components to determine that they are not air bound and that piping is full of water.
- E. Perform the following steps before operation:
 1. Close drain valves, hydrants, and hose bibbs.
 2. Open shutoff valves to fully open position.
 3. Open throttling valves to proper setting.
 4. Remove plugs used during testing of piping and plugs used for temporary sealing of piping during installation.
 5. Remove and clean strainer screens. Close drain valves and replace drain plugs.
 6. Remove filter cartridges from housings, and verify that cartridges are as specified for application where used and that cartridges are clean and ready for use.
- F. Check plumbing equipment and verify proper settings, adjustments, and operation. Do not operate water heaters before filling with water.
- G. Check plumbing specialties and verify proper settings, adjustments, and operation.
 1. Water-Pressure Regulators: Set outlet pressure at 80 psig maximum, unless otherwise indicated.

3.4 JOINT CONSTRUCTION

- A. Refer to Division 15 Section 15050 "Basic Mechanical Materials and Methods" for basic piping joint construction.
- B. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.5 VALVE INSTALLATION

- A. Install sectional valve close to water main on each branch and riser serving plumbing fixtures or equipment. Use ball or gate valves for piping NPS 2 and smaller. Use butterfly or gate valves for piping NPS 2-1/2 and larger.
- B. Install shutoff valve on each water supply to equipment and on each water supply to plumbing fixtures without supply stops. Use ball or gate valves for piping NPS 2 and smaller. Use butterfly or gate valves for piping NPS 2-1/2 and larger.

3.6 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment and machines to allow service and maintenance.
- C. Connect domestic water piping to exterior water service piping. Use transition fitting to join dissimilar piping materials.
- D. Connect domestic water piping to service piping with shutoff valve, and extend and connect to the following:
 - 1. Water Heaters: Cold-water supply and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
 - 2. Plumbing Fixtures: Cold- and hot-water supply piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 15 Section 15410 "Plumbing Fixtures."
 - 3. Equipment: Cold- and hot-water supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.7 FIELD QUALITY CONTROL

- A. Inspect domestic water piping as follows:
 - 1. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
 - 2. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

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- a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - b. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
3. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
 4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

B. Test domestic water piping as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced domestic water piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
4. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
5. Prepare reports for tests and required corrective action.

3.8 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing domestic water piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction or, if methods are not prescribed, procedures described in either AWWA C651 or AWWA C652 or as described below:
 - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - b. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.

- c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
 - d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedures if biological examination shows contamination.
- B. Prepare and submit reports of purging and disinfecting activities.
- C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

END OF SECTION 15140

SECTION 15150
SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes soil and waste, sanitary drainage and vent piping inside the building.

1.2 SUBMITTALS

- A. Field quality-control test reports.

1.3 QUALITY ASSURANCE

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping; "NSF-drain" for plastic drain piping; "NSF-tubular" for plastic continuous waste piping; and "NSF-sewer" for plastic sewer piping.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Hub-and-Spigot Cast-Iron Pipe and Fittings: ASTM A 74, Service and Extra-Heavy classes.
 - 1. Gaskets: ASTM C 564, rubber.
- B. Hubless Cast-Iron Pipe and Fittings: ASTM A 888 or CISPI 301.
 - 1. Couplings: ASTM C 1277 assembly of metal housing, corrosion-resistant fasteners, and ASTM C 564 rubber sleeve with integral, center pipe stop.
 - a. Heavy-Duty, Type 304, Stainless-Steel Couplings: ASTM A 666, Type 304, stainless-steel shield; stainless-steel bands; and sleeve.
 - 1) NPS 1-1/2 to NPS 4: 3-inch- wide shield with 4 bands.
 - 2) NPS 5 to NPS 10: 4-inch- wide shield with 6 bands.
 - b. Heavy-Duty, FMG-Approved Couplings: ASTM A 666, Type 304, stainless-steel housing; stainless-steel bands; and sleeve.

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- 1) NPS 1-1/2 to NPS 4: 3-inch- wide housing with 2 bands.
 - 2) NPS 5 to NPS 10: 4-inch- wide housing with 2 bands.
 - c. Heavy-Duty, Cast-Iron Couplings: ASTM A 48, 2-piece, cast-iron housing; stainless-steel bolts and nuts; and sleeve.
 - d. Heavy-Duty, Type 301, Stainless-Steel Couplings: ASTM A 666, Type 301, stainless-steel shield; stainless-steel bands; and sleeve.
 - 1) NPS 1-1/2 to NPS 4: 3-inch- wide shield with 4 bands.
 - 2) NPS 5 to NPS 10: 4-inch- wide shield with 6 bands.
 - e. Compact, Stainless-Steel Couplings: CISPI 310 with ASTM A 167, Type 301, or ASTM A 666, Type 301, stainless-steel corrugated shield; stainless-steel bands; and sleeve.
 - 1) NPS 1-1/2 to NPS 4: 2-1/8-inch- wide shield with 2 bands.
 - 2) NPS 5 and NPS 6: 3-inch- wide shield with 4 bands.
 - 3) NPS 8 and NPS 10: 4-inch- wide shield with 4 bands.
 - 4) NPS 12 and NPS 15: 5-1/2-inch- wide shield with 6 bands.
- C. Steel Pipe: ASTM A 53, Type E or S, Grade A or B, Schedule 40, galvanized. Include ends matching joining method.
1. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53 or ASTM A 106, Schedule 40, galvanized, seamless steel pipe. Include ends matching joining method.
 2. Malleable-Iron Unions: ASME B16.39; Class 150; hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface; and female threaded ends.
 3. Cast-Iron, Threaded, Drainage Fittings: ASME B16.12, galvanized.
 4. Gray-Iron, Threaded Fittings: ASME B16.4, Class 125, galvanized, standard pattern.
 5. Cast-Iron Flanges: ASME B16.1, Class 125.
 6. Cast-Iron, Flanged Fittings: ASME B16.1, Class 125, galvanized.
 7. Steel-Piping, Expansion Joints: Compound, galvanized steel fitting with telescoping body and slip-pipe section. Include packing rings, packing, limit rods, chrome-plated finish on slip-pipe section, and flanged ends.
 8. Steel-Piping, Double Expansion Joints: Compound, galvanized steel fitting with telescoping body and two slip-pipe sections. Include packing rings, packing, limit rods, chrome-plated finish on slip-pipe sections, and flanged ends.
- D. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.
1. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.
- E. Soft Copper Tube: ASTM B 88, Type L, water tube, annealed temper.

1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought- copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end.
3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

F. Hard Copper Tube: ASTM B 88, Types L and M, water tube, drawn temper.

1. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought- copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
2. Bronze Flanges: ASME B16.24, Class 150, with solder-joint end.
3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Transition and special fittings with pressure ratings at least equal to piping pressure ratings may be used in applications below, unless otherwise indicated.
- B. Flanges may be used on aboveground pressure piping, unless otherwise indicated.
- C. Aboveground, Soil, Waste, and Vent Piping: Use the following piping materials for each size range:
 1. NPS 1-1/4 and NPS 1-1/2: Use NPS 1-1/2 hubless, cast-iron soil piping and one of the following:
 - a. Couplings: Heavy-duty, cast iron.
 2. NPS 1-1/4 and NPS 1-1/2: Steel pipe; cast-iron, threaded drainage fittings; and threaded joints.
 3. NPS 1-1/4 and NPS 1-1/2: Copper DWV tube, copper drainage fittings, and soldered joints.
 4. NPS 2 to NPS 4: Service class, cast-iron soil piping; gaskets; and gasketed joints.
 5. NPS 2 to NPS 4: Hubless, cast-iron soil piping and one of the following:
 - a. Couplings: Heavy-duty, cast iron.
 6. NPS 2 to NPS 4: Steel pipe; cast-iron, threaded drainage fittings; and threaded joints.
 7. NPS 2 to NPS 4: Copper DWV tube, copper drainage fittings, and soldered joints.

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- a. Option for Vent Piping, NPS 2-1/2 and NPS 3-1/2: Hard copper tube, Type M; copper pressure fittings; and soldered joints.
- 8. NPS 5 and NPS 6: Service class, cast-iron soil piping; gaskets; and gasketed joints.
- 9. NPS 5 and NPS 6: Hubless, cast-iron soil piping and one of the following:
 - a. Couplings: Heavy-duty, cast iron.
- 10. NPS 5 and NPS 6: Steel pipe; cast-iron, threaded drainage fittings; and threaded joints.
- 11. NPS 5 and NPS 6: Copper DWV tube, copper drainage fittings, and soldered joints.

3.2 PIPING INSTALLATION

- A. Refer to Division 15 Section 15050 "Basic Mechanical Materials and Methods" for basic piping installation.
- B. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers.
- C. Install cast-iron sleeve with water stop and mechanical sleeve seal at each service pipe penetration through foundation wall. Select number of interlocking rubber links required to make installation watertight. Refer to Division 15 Section 15050 "Basic Mechanical Materials and Methods" for sleeves and mechanical sleeve seals.
- D. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
 - 1. Encase underground piping with PE film according to ASTM A 674 or AWWA C105.
- E. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if 2 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. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- F. Install soil and waste drainage and vent piping at the following minimum slopes, unless otherwise indicated:
 - 1. Building Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.

2. Horizontal Sanitary Drainage Piping: 2 percent downward in direction of flow.
 3. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.
- G. Sleeves are not required for cast-iron soil piping passing through concrete slabs-on-grade if slab is without membrane waterproofing.
- H. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

3.3 JOINT CONSTRUCTION

- A. Refer to Division 15 Section 15050 "Basic Mechanical Materials and Methods" for basic piping joint construction.
- B. Cast-Iron, Soil-Piping Joints: Make joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
1. Gasketed Joints: Make with rubber gasket matching class of pipe and fittings.
 2. Hubless Joints: Make with rubber gasket and sleeve or clamp.
- C. Soldered Joints: Use ASTM B 813, water-flushable, lead-free flux; ASTM B 32, lead-free-alloy solder; and ASTM B 828 procedure, unless otherwise indicated.

3.4 VALVE INSTALLATION

- A. Shutoff Valves: Install shutoff valve on each sewage pump discharge.
1. Use gate or full-port ball valve for piping NPS 2 and smaller.
 2. Use gate valve for piping NPS 2-1/2 and larger.
- B. Check Valves: Install swing check valve, downstream from shutoff valve, on each sewage pump discharge.

3.5 HANGER AND SUPPORT INSTALLATION

- A. Refer to Division 15 Section 15071 "Mechanical Vibration and Seismic Controls" for seismic-restraint devices.
- B. Refer to Division 15 Section 15060 "Hangers and Supports" for pipe hanger and support devices. Install the following:
1. Vertical Piping: MSS Type 8 or Type 42, clamps.
 2. Individual, Straight, Horizontal Piping Runs: According to the following:
 - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.

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- b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
 - c. Longer Than 100 Feet, if Indicated: MSS Type 49, spring cushion rolls.
- 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
- 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Install supports according to Division 15 Section 15060 "Hangers and Supports."
- D. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.6 CONNECTIONS

- A. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- B. Connect drainage and vent piping to the following:
 - 1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 15 Section 15410 "Plumbing Fixtures."
 - 2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
 - 3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code. Refer to Division 15 Section 15430 "Plumbing Specialties."
 - 4. Equipment: Connect drainage piping as indicated. Provide shutoff valve, if indicated, and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.

3.7 FIELD QUALITY CONTROL

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
 - 1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
 - 2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction.
 - 1. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
 - 2. Prepare reports for tests and required corrective action.

3.8 CLEANING

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION 15150

SECTION 15182 CONDENSATE PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes condensate piping and specialties for systems operating at less than 15 psig, inside the building.
- B. See Division 15 Section 15050 "Basic Mechanical Materials and Methods" for general piping materials and installation requirements.

1.2 SUBMITTALS

- A. Shop Drawings: Include flash tank assemblies and fabrication of pipe anchors, hangers, special pipe support assemblies, alignment guides, and expansion joints and loops and their attachment to the building structure. Include dimensions, weights, loadings, required clearances, method of field assembly, components, and location and size of each field connection.
- B. Welding certificates.
- C. Field quality-control test reports.
- D. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for materials, products, and installation. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp flash tanks to comply with the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1.

1.4 COORDINATION

- A. Coordinate pipe sleeve installations for foundation wall penetrations.
- B. Coordinate piping installation with roof curbs, equipment supports, and roof penetrations. Roof specialties are specified in Division 7 Sections.
- C. Coordinate pipe fitting pressure classes with products specified in related Sections.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

Condensate Piping

- A. In other Part 2 articles where subparagraphs titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE AND FITTINGS

- A. Steel Pipe, NPS 2 and Smaller: ASTM A 53, Type S (seamless), Grade A, Schedules 40 and 80, black steel, plain ends.
- B. Steel Pipe, NPS 2-1/2 and Larger: ASTM A 53, Type E (electric-resistance welded), Grade A, Schedules 40 and 80, black steel, plain ends.
- C. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53, Schedules 40 and 80, black steel; seamless for NPS 2 and smaller and electric-resistance welded for NPS 2-1/2 and larger.
- D. Flexible Connectors: Stainless-steel bellows with woven, flexible, bronze, wire-reinforcing protective jacket; 150-psig minimum working pressure and 250 deg F maximum operating temperature. Connectors shall have flanged or threaded-end connections to match equipment connected and shall be capable of 3/4-inch misalignment.
- E. Welding Materials: Comply with Section II, Part C, of the ASME Boiler and Pressure Vessel Code for welding materials appropriate for wall thickness and for chemical analysis of pipe being welded.
- F. Gasket Material: Thickness, material, and type suitable for fluid to be handled; and design temperatures and pressures.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Condensate Piping, NPS 2 and Smaller: Schedule 80 steel pipe, with threaded joints using Class 125 malleable-iron fittings.

3.2 PIPING INSTALLATIONS

- A. Install condensate return piping at a uniform grade of 0.4 percent downward in direction of condensate flow.
- B. Reduce pipe sizes using eccentric reducer fitting installed with level side down.

- C. Anchor piping for proper direction of expansion and contraction.
- D. Pitch condensate piping down toward drain.

3.3 TERMINAL EQUIPMENT CONNECTIONS

- A. Size for supply and return piping connections shall be same as for equipment connections.
 - 1. Install traps and control valves in accessible locations close to connected equipment.
 - 2. Install bypass piping with globe valve around control valve. If multiple, parallel control valves are installed, only one bypass is required.
 - 3. Install vacuum breaker downstream from control valve and bypass and close to coil inlet connection.
 - 4. Install ports for pressure and temperature gages at coil inlet connections.
 - 5. Install a drip leg at coil outlet.

3.4 FIELD QUALITY CONTROL

- A. Test steam and condensate piping according to ASME B31.9.

3.5 CLEANING

- A. Flush system with clean water.
- B. Clean strainers.

END OF SECTION 15182

SECTION 15183 REFRIGERANT PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes refrigerant piping used for air-conditioning applications.

1.2 SUBMITTALS

- A. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop, based on manufacturer's test data, for thermostatic expansion valves, solenoid valves, and pressure-regulating valves.
- B. Shop Drawings: Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes, flow capacities, valve arrangements and locations, slopes of horizontal runs, oil traps, double risers, wall and floor penetrations, and equipment connection details. Show interface and spatial relationship between piping and equipment.
 - 1. Refrigerant piping indicated is schematic only. Size piping and design the actual piping layout, including oil traps, double risers, specialties, and pipe and tube sizes, to ensure proper operation and compliance with warranties of connected equipment.
- C. Welding and brazing certificates
- D. Field quality-control test reports.
- E. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX; "Welding and Brazing Qualifications."
- B. ASHRAE Standard: Comply with ASHRAE 15, "Safety Code for Mechanical Refrigeration."
- C. ASME Standard: Comply with ASME B31.5, "Refrigeration Piping."
- D. UL Standard: Provide products complying with UL 207, "Refrigerant-Containing Components and Accessories, Nonelectrical"; or UL 429, "Electrically Operated Valves."

PART 2 - PRODUCTS

Refrigerant Piping

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Refrigerants:
 - a. Allied Signal, Inc./Fluorine Products; Genetron Refrigerants.
 - b. DuPont Company; Fluorochemicals Div.
 - c. Elf Atochem North America, Inc.; Fluorocarbon Div.
 - d. ICI Americas Inc./ICI KLEA; Fluorochemicals Bus.
 - 2. Refrigerant Valves and Specialties:
 - a. Climate & Industrial Controls Group; Parker-Hannifin Corp.; Refrigeration & Air Conditioning Division.
 - b. Danfoss Electronics, Inc.
 - c. Emerson Electric Company; Alco Controls Div.
 - d. Henry Valve Company.
 - e. Sporlan Valve Company.

2.2 COPPER TUBE AND FITTINGS

- A. Drawn-Temper Copper Tube: ASTM B 88, Type L.
- B. Annealed-Temper Copper Tube: ASTM B 88, Type K.
- C. Wrought-Copper Fittings: ASME B16.22.
- D. Wrought-Copper Unions: ASME B16.22.
- E. Bronze Filler Metals: AWS A5.8, Classification BAg-1 (silver)

2.3 VALVES

- A. Diaphragm Packless Valves: 500-psig working pressure and 275 deg F working temperature; globe design with straight-through or angle pattern; forged-brass or bronze body and bonnet, phosphor bronze and stainless-steel diaphragms, rising stem and handwheel, stainless-steel spring, nylon seat disc, and with solder-end connections.
- B. Packed-Angle Valves: 500-psig working pressure and 275 deg F working temperature; forged-brass or bronze body, forged-brass seal caps with copper

gasket, back seating, rising stem and seat, molded stem packing, and with solder-end connections.

- C. Check Valves Smaller Than NPS 1: 400-psig operating pressure and 285 deg F operating temperature; cast-brass body, with removable piston, polytetrafluoroethylene seat, and stainless-steel spring; globe design. Valve shall be straight-through pattern, with solder-end connections.
- D. Check Valves, NPS 1 and Larger: 400-psig operating pressure and 285 deg F operating temperature; cast-bronze body, with cast-bronze or forged-brass bolted bonnet; floating piston with mechanically retained polytetrafluoroethylene seat disc. Valve shall be straight-through or angle pattern, with solder-end connections.
- E. Service Valves: 500-psig pressure rating; forged-brass body with copper stubs, brass caps, removable valve core, integral ball check valve, and with solder-end connections.
- F. Solenoid Valves: Comply with ARI 760; 250 deg F temperature rating and 400-psig working pressure; forged brass, with polytetrafluoroethylene valve seat, 2-way, straight-through pattern, and solder-end connections; manual operator; fitted with suitable NEMA 250 enclosure of type required by location, with 1/2-inch conduit adapter and 24-V, normally closed holding coil.
- G. Pressure-Regulating Valves: Comply with ARI 770; pilot operated, forged brass or cast bronze, stainless-steel bottom spring, pressure-gage tapings, 24-V dc standard coil, and wrought-copper fittings for solder-end connections; suitable for refrigerant specified.
- H. Pressure-Regulating Valves: Comply with ARI 770; direct acting, brass; with pilot operator, stainless-steel diaphragm, standard coil, and solder-end connection; suitable for refrigerant specified.
- I. Pressure Relief Valves: Straight-through or angle pattern, brass body and disc, neoprene seat, and factory sealed and ASME labeled for standard pressure setting.
- J. Thermostatic Expansion Valves: Comply with ARI 750; brass body with stainless-steel parts; thermostatic-adjustable, modulating type; size and operating characteristics as recommended by manufacturer of evaporator, and factory set for superheat requirements; solder-end connections; with sensing bulb, distributor having side connection for hot-gas bypass line, and external equalizer line.
- K. Hot-Gas Bypass Valve: Pulsating-dampening design, stainless-steel bellows and polytetrafluoroethylene valve seat; adjustable; sized for capacity equal to last step of compressor unloading; with solder-end connections.

2.4 REFRIGERANT PIPING SPECIALITIES

- A. Straight- or Angle-Type Strainers: 500-psig working pressure; forged-brass or steel body with stainless-steel wire or brass-reinforced Monel screen of 80 to 100 mesh in liquid lines up to 1-1/8 inches, 60 mesh in larger liquid lines, and 40 mesh in suction lines; with screwed cleanout plug and solder-end connections.
- B. Moisture/Liquid Indicators: 500-psig maximum working pressure and 200 deg F operating temperature; all-brass body with replaceable, polished, optical viewing window with color-coded moisture indicator; with solder-end connections.
- C. Replaceable-Core Filter-Dryers: 500-psig maximum working pressure; heavy gage protected with corrosion-resistant-painted steel shell, flanged ring and spring, ductile-iron cover plate with steel cap screws; wrought-copper fittings for solder-end connections; with replaceable-core kit, including gaskets and the following:
 - 1. Filter Cartridge: Pleated media with integral end rings, stainless-steel support, ARI 730 rated for capacity.
 - 2. Filter-Dryer Cartridge: Pleated media with solid-core sieve with activated alumina, ARI 730 rated for capacity.
 - 3. Wax Removal Cartridge: Molded, bonded core of activated charcoal and desiccant with integral gaskets.
- D. Permanent Filter-Dryer: 350-psig maximum operating pressure and 225 deg F maximum operating temperature; steel shell and wrought-copper fittings for solder-end connections; molded-felt core surrounded by desiccant.
- E. Mufflers: 500-psig operating pressure, welded-steel construction with fusible plug; sized for refrigeration capacity.

2.5 RECEIVERS

- A. Receivers, 6-Inch Diameter and Smaller: ARI 495, UL listed, steel, brazed, 400-psig pressure rating, with tappings for inlet, outlet, and pressure relief valve.
- B. Receivers Larger Than 6-Inch Diameter: ARI 495, welded steel, tested and stamped according to ASME Boiler and Pressure Vessel Code: Section VIII; 400-psig pressure rating, with tappings for liquid inlet and outlet valves, pressure relief valve, and liquid-level indicator.

2.6 REFRIGERANTS

- A. ASHRAE 34, R-123: Dichlorotrifluoroethane.

- B. ASHRAE 34, R-134a: Tetrafluoroethane.
- C. ASHRAE 34, R-22: Monochlorodifluoromethane.
- D. ASHRAE 34, R-500: Azeotrope.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Aboveground, within Building: Type L drawn-copper tubing.

3.2 VALVE APPLICATIONS

- A. Install diaphragm packless or packed-angle valves in suction and discharge lines of compressor, for gage taps at hot-gas bypass regulators, on each side of strainers.
- B. Install check valves in compressor discharge lines and in condenser liquid lines on multiple condenser systems.
- C. Install packed-angle valve in liquid line between receiver shutoff valve and thermostatic expansion valve for system charging.
- D. Install diaphragm packless or packed-angle valves on each side of strainers and dryers, in liquid and suction lines at evaporators, and elsewhere as indicated.
- E. Install a full-sized, three-valve bypass around each dryer.
- F. Install solenoid valves upstream from each expansion valve and hot-gas bypass valve.
 - 1. Install solenoid valves in horizontal lines with coil at top.
 - 2. Electrical wiring for solenoid valves is specified in Division 16 Sections. Coordinate electrical requirements and connections.
- G. Install thermostatic expansion valves as close as possible to evaporator.
 - 1. If refrigerant distributors are used, install them directly on expansion-valve outlet.
 - 2. Install valve so diaphragm case is warmer than bulb.
 - 3. Secure bulb to clean, straight, horizontal section of suction line using two bulb straps. Do not mount bulb in a trap or at bottom of the line.
 - 4. If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.
- H. Install pressure-regulating and pressure relief valves as required by ASHRAE 15. Pipe pressure relief valve discharge to outside.

3.3 SPECIALTY APPLICATIONS

- A. Install liquid indicators in liquid line leaving condenser, in liquid line leaving receiver, and on leaving side of liquid solenoid valves.
- B. Install strainers immediately upstream from each automatic valve, including expansion valves, solenoid valves, hot-gas bypass valves, and compressor suction valves.
- C. Install strainers in main liquid line where multiple expansion valves with integral strainers are used.
- D. Install strainers in suction line of steel pipe.
- E. Install moisture-liquid indicators in liquid lines between filter-dryers and thermostatic expansion valves and in liquid line to receiver.
- F. Install pressure relief valves on ASME receivers; pipe discharge to outdoors.
- G. Install replaceable-core filter-dryers in vertical liquid line adjacent to receivers and before each solenoid valve.
- H. Install permanent filter-dryers in low-temperature systems, in systems using hermetic compressors, and before each solenoid valve.
- I. Install solenoid valves in liquid line of systems operating with single pump-out or pump-down compressor control, in liquid line of single or multiple evaporator systems, and in oil bleeder lines from flooded evaporators to stop flow of oil and refrigerant into suction line when system shuts down.
- J. Install receivers, sized to accommodate pump-down charge, on systems 5 tons and larger and on systems with long piping runs.
- K. Install flexible connectors at or near compressors where piping configuration does not absorb vibration.

3.4 PIPING INSTALLATION

- A. Install refrigerant piping according to ASHRAE 15.
- B. Basic piping installation requirements are specified in Division 15 Section 15050 "Basic Mechanical Materials and Methods."
- C. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- D. Arrange piping to allow inspection and service of compressor and other equipment. Install valves and specialties in accessible locations to allow for service and inspection.

- E. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation. Use sleeves through floors, walls, or ceilings, sized to permit installation of full-thickness insulation.
- F. Belowground, install copper tubing in protective conduit. Vent conduit outdoors.
- G. Install copper tubing in rigid or flexible conduit in locations where copper tubing will be exposed to mechanical injury.
- H. Slope refrigerant piping as follows:
 - 1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
 - 2. Install horizontal suction lines with a uniform slope downward to compressor.
 - 3. Install traps and double risers to entrain oil in vertical runs.
 - 4. Liquid lines may be installed level.
- I. Install bypass around moisture-liquid indicators in lines larger than NPS 2.
- J. Install unions to allow removal of solenoid valves, pressure-regulating valves, and expansion valves and at connections to compressors and evaporators.
- K. When brazing, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion valve bulb.
- L. Hanger, support, and anchor products are specified in Division 15 Section 15060 "Hangers and Supports."

3.5 PIPE JOINT CONSTRUCTION

- A. Braze joints according to Division 15 Section 15050 "Basic Mechanical Materials and Methods."
- B. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide) during brazing to prevent scale formation.

3.6 FIELD QUALITY CONTROL

- A. Test and inspect refrigerant piping according to ASME B31.5, Chapter VI.
 - 1. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure.
 - 2. Test high- and low-pressure side piping of each system at not less than the lower of the design pressure or the setting of pressure relief device protecting high and low side of system.

Refrigerant Piping

- a. System shall maintain test pressure at the manifold gage throughout duration of test.
- b. Test joints and fittings by brushing a small amount of soap and glycerine solution over joint.
- c. Fill system with nitrogen to raise a test pressure of 150 psig or higher as required by authorities having jurisdiction.
- d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

3.7 SYSTEM CHARGING

A. Charge system using the following procedures:

1. Install core in filter-dryer after leak test but before evacuation.
2. Evacuate entire refrigerant system with a vacuum pump to a vacuum of 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
4. Charge system with a new filter-dryer core in charging line. Provide full-operating charge.

END OF SECTION 15183

SECTION 15194 FUEL GAS PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes fuel gas piping, specialties, and accessories within the building.

1.2 SUBMITTALS

A. Product Data:

1. Corrugated, stainless-steel tubing systems. Include associated components.
2. Specialty valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
3. Service meters. Include pressure rating and capacity of selected models.
4. Pressure regulators. Include pressure rating, capacity, and settings of selected models.

- B. Shop Drawings: For fuel gas piping. Include plans and attachments to other Work

1. Wiring Diagrams: Power, signal, and control wiring.

- C. Field quality-control test reports.

- D. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. ANSI Standard: Comply with ANSI Z223.1, "National Fuel Gas Code."

- B. FMG Standard: Provide components listed in FMG's "Fire Protection Approval Guide" if specified to be FMG approved.

- C. IAS Standard: Provide components listed in IAS's "Directory of A. G. A. and C. G. A Certified Appliances and Accessories" if specified to be IAS listed.

- D. UL Standard: Provide components listed in UL's "Gas and Oil Equipment Directory" if specified to be UL listed.

1.4 COORDINATION

- A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after

Fuel Gas Piping

arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Architect's written permission.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPING MATERIALS

A. Corrugated, Stainless-steel Tubing Systems: Comply with AGA LC 1 and include the following:

1. Tubing: Corrugated stainless steel with plastic jacket or coating.
2. Fittings: Copper alloy with ends made to fit corrugated tubing. Include ends with threads according to ASME B1.20.1 if connection to threaded pipe or fittings is required.
3. Striker Plates: Steel, designed to protect tubing from penetrations.

B. Steel Pipe: ASTM A 53; Type E or S; Grade B; Schedule 40; black.

1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern, with threaded ends according to ASME B1.20.1.
2. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends according to ASME B1.20.1.
3. Cast-Iron Flanges and Flanged Fittings: ASME B16.1, Class 125.
4. Steel Welding Fittings: ASME B16.9, wrought steel or ASME B16.11, forged steel.
5. Steel Threaded Fittings: ASME B16.11, forged steel with threaded ends according to ASME B1.20.1.
6. Joint Compound and Tape: Suitable for natural gas.
7. Steel Flanges and Flanged Fittings: ASME B16.5.
8. Gasket Material: Thickness, material, and type suitable for natural gas.

C. Soft Copper Tube: ASTM B 88, Type L, water tube, annealed temper.

1. Copper Fittings: ASME B16.22, wrought copper, streamlined pattern.
2. Brazing Filler Metals: AWS A5.8, Silver Classification BAg-1. Filler metal containing phosphorus is prohibited.

- D. Transition Fittings: Type, material, and end connections to match piping being joined.
- E. Common Joining Materials: Refer to Division 15 Section 15050 "Basic Mechanical Materials and Methods" for joining materials not in this Section.

2.3 PROTECTIVE COATING

- A. Furnish pipe and fittings with factory-applied, corrosion-resistant polyethylene coating for use in corrosive atmosphere.

2.4 SPECIALTIES

- A. Flexible Connectors: ANSI Z21.24, copper alloy.
- B. Quick-Disconnect Devices: ANSI Z21.41, convenience outlets and matching plug connector.

2.5 VALVES

- A. Valves, NPS 2 and Smaller: Threaded ends according to ASME B1.20.1 for pipe threads.
- B. Valves, NPS 2-1/2 and Larger: Flanged ends according to ASME B16.5 for steel flanges and according to ASME B16.24 for copper and copper-alloy flanges.
- C. Appliance Connector Valves: ANSI Z21.15 and IAS listed.
- D. Gas Stops: Bronze body with AGA stamp, plug type with bronze plug and flat or square head, ball type with chrome-plated brass ball and lever handle, or butterfly valve with stainless-steel disc and fluorocarbon elastomer seal and lever handle; 2-psig minimum pressure rating.
- E. Gas Valves, NPS 2 and Smaller: ASME B16.33 and IAS-listed bronze body and 125-psig pressure rating.
- F. Plug Valves, NPS 2-1/2 and Larger: ASME B16.38 and MSS SP-78 cast-iron, lubricated plug valves, with 125-psig pressure rating.
- G. General-Duty Valves, NPS 2-1/2 and Larger: MSS SP-70, ASME B16.38, cast-iron body gate valves, OS&Y type with solid wedge, suitable for fuel gas service, with "WOG" indicated on valve body, and 125-psig pressure rating.

PART 3 - EXECUTION

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Fuel Gas Piping

3.1 PIPING APPLICATIONS

- A. Use flanges, unions, transition, and special fittings in applications below, unless otherwise indicated.
 - 1. NPS 1/2 and Smaller: NPS 3/4 steel pipe, malleable-iron threaded fittings, and threaded joints.
 - 2. NPS 1/2 and Smaller: Soft copper tube, copper fittings, and brazed joints.
 - 3. NPS 1/2 and Smaller: Corrugated, stainless-steel tubing system and threaded joints.
 - 4. NPS 3/4 and NPS 1: Steel pipe, malleable-iron threaded fittings, and threaded joints.
 - 5. NPS 3/4 and NPS 1: Soft copper tube, copper fittings, and brazed joints.
 - 6. NPS 3/4 and NPS 1: Corrugated, stainless-steel tubing system and threaded joints.
 - 7. NPS 1-1/4 to NPS 4: Steel pipe, malleable-iron threaded fittings, and threaded joints.
 - 8. NPS 1-1/4 to NPS 4: Steel pipe, steel welding fittings, and welded joints.
 - 9. Larger Than NPS 4: Steel pipe, steel welding fittings, and welded joints.

3.2 VALVE APPLICATIONS

- A. Appliance Shutoff Valves for Pressure 0.5 psig or Less: Appliance connector valve or gas stop.
- B. Appliance Shutoff Valves for Pressure 0.5 to 2 psig: Gas stop or gas valve.
- C. Piping Line Valves, NPS 2 and Smaller: Gas valve.
- D. Piping Line Valves, NPS 2-1/2 and Larger: Plug valve or general-duty valve.
- E. Valves at Service Meter, NPS 2 and Smaller: Gas valve.
- F. Valves at Service Meter, NPS 2-1/2 and Larger: Plug valve.

3.3 INSTALLATION

- A. Refer to Division 15 Section 15050 "Basic Mechanical Materials and Methods" for basic piping installation requirements and piping joint construction.
- B. Service Entrance Piping: Extend fuel gas piping and connect to fuel gas distribution for service entrance to building.
 - 1. Exterior fuel gas distribution system piping, service pressure regulator, and service meter will be provided by gas utility.
 - 2. Natural gas distribution system piping, service pressure regulator, and service meter are specified in Division 2 Section 02553 "Natural Gas Distribution."

3. Install dielectric fitting downstream from and adjacent to each service meter unless meter is supported from service-meter bar with integral dielectric fitting. Install shutoff valve downstream from and adjacent to dielectric fitting. Refer to Division 15 Section 15050 "Basic Mechanical Materials and Methods" for dielectric fittings.
 4. Install strainer upstream from each earthquake valve. Refer to Division 15 Section 15430 "Plumbing Specialties" for strainers.
- C. Concealed Locations: Except as specified below, install concealed gas piping in airtight conduit constructed of Schedule 40, seamless, black steel pipe with welded joints. Vent conduit to outside and terminate with screened vent cap.
1. Above-Ceiling Locations: Gas piping may be installed in accessible spaces, subject to approval of authorities having jurisdiction, whether or not such spaces are used as plenums. Do not locate valves above ceilings.
 2. In Partitions: Do not install concealed piping in solid partitions. Protect tubing from physical damage when installed inside partitions or hollow walls.
 3. In Walls: Gas piping with welded joints and protective wrapping specified in "Protective Coating" Article in Part 2 may be installed in masonry walls, subject to approval of authorities having jurisdiction.
 4. Prohibited Locations: Do not install gas piping in or through circulating air ducts, clothes or trash chutes, chimneys or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.
- D. Drips and Sediment Traps: Install drips at points where condensate may collect. Include outlets of service meters. Locate where readily accessible for cleaning and emptying. Do not install where condensate would be subject to freezing.
1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use minimum-length nipple of 3 pipe diameters, but not less than 3 inches long, and same size as connected pipe. Install with space between bottom of drip and floor for removal of plug or cap.
- E. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, and in floor channels, unless indicated to be exposed to view.
- F. Install fuel gas piping at uniform grade of 0.1 percent slope upward toward risers.
- G. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
- H. Connect branch piping from top or side of horizontal piping.

Fuel Gas Piping

- I. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment, and elsewhere as indicated. Unions are not required on flanged devices.
- J. Install corrugated, stainless-steel tubing system according to manufacturer's written instructions. Include striker plates to protect tubing from puncture where tubing is restrained and cannot move.
- K. Install strainer on inlet of each line pressure regulator and automatic and electrically operated valve.
- L. Install flanges on valves, specialties, and equipment having NPS 2-1/2 and larger connections.

3.4 HANGERS AND SUPPORTS

- A. Refer to Division 15 Section 15060 "Hangers and Supports" for pipe hanger and support devices.
- B. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:
 - 1. NPS 1 and Smaller: Maximum span, 96 inches; minimum rod size, 3/8 inch.
 - 2. NPS 1-1/4: Maximum span, 108 inches; minimum rod size, 3/8 inch.
 - 3. NPS 1-1/2 and NPS 2: Maximum span, 108 inches; minimum rod size, 3/8 inch.
 - 4. NPS 2-1/2 to NPS 3-1/2: Maximum span, 10 feet; minimum rod size, 1/2 inch.
 - 5. NPS 4 and Larger: Maximum span, 10 feet; minimum rod size, 5/8 inch.
- C. Install hangers for horizontal corrugated, stainless-steel tubing with the following maximum spacing and minimum rod sizes:
 - 1. NPS 3/8 and NPS 1/2: Maximum span, 48 inches; minimum rod size, 3/8 inch.
 - 2. NPS 3/4 and NPS 1: Maximum span, 72 inches; minimum rod size, 3/8 inch.
 - 3. Option: Support tubing from structure according to manufacturer's written instructions.

3.5 CONNECTIONS

- A. Install piping adjacent to appliances to allow service and maintenance. Connect piping to appliances using gas with shutoff valves and unions. Install valve upstream from and within 72 inches of each appliance. Install union downstream from valve.

3.6 FIELD QUALITY CONTROL

- A. Inspect, test, and purge piping according to ANSI Z223.1, Part 4 "Inspection, Testing, and Purging," and requirements of authorities having jurisdiction. Repair leaks and defects with new materials and retest system until satisfactory results are obtained.

END OF SECTION 15194

SECTION 15410 PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes plumbing fixtures and related components.

1.2 DEFINITIONS

- A. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.

1.3 SUBMITTALS

- A. Product Data: Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports and indicate materials and finishes, dimensions, construction details, and flow-control rates for each type of fixture indicated.
- B. Operation and maintenance data.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in 2001 edition of the California Electrical Code, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act"; Public Law 101-336, "Americans with Disabilities Act"; and California Code of Regulations, Title 24, California Building Code and California Plumbing Code about plumbing fixtures for people with disabilities.
- C. Regulatory Requirements: Comply with requirements in U.S. Architectural & Transportation Barriers Compliance Board's "Uniform Federal Accessibility Standards (UFAS), 1985-494-187" about plumbing fixtures for people with disabilities and California Code of Regulations, Title 24, 2001California Building Code and 2001California Plumbing Code.
- D. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," and California Code of Regulations, Title 24, California Plumbing Code about water flow and consumption rates for plumbing fixtures.

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Plumbing Fixtures

- E. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.
- F. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.
- G. Comply with the following applicable standards and other requirements specified for plumbing fixtures:
 - 1. Enameled, Cast-Iron Fixtures: ASME A112.19.1M.
 - 2. Hand Sinks: NSF 2 construction.
 - 3. Vitreous-China Fixtures: ASME A112.19.2M.
 - 4. Water-Closet, Flushometer Tank Trim: ASSE 1037.
- H. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:
 - 1. Faucets: ASME A112.18.1M.
- I. Comply with the following applicable standards and other requirements specified for shower faucets:
 - 1. Combination, Pressure-Equalizing and Thermostatic-Control Antiscald Faucets: ASSE 1016.
 - 2. Faucets: ASME A112.18.1M.
 - 3. High-Temperature-Limit Controls for Thermal-Shock-Preventing Devices: ASTM F 445.
 - 4. Manual-Control Antiscald Faucets: ASTM F 444.
 - 5. Pipe Threads: ASME B1.20.1.
 - 6. Pressure-Equalizing-Control Antiscald Faucets: ASTM F 444 and ASSE 1016.
 - 7. Thermostatic-Control Antiscald Faucets: ASTM F 444 and ASSE 1016.
- J. Comply with the following applicable standards and other requirements specified for miscellaneous fittings:
 - 1. Brass and Copper Supplies: ASME A112.18.1M.
 - 2. Tubular Brass Drainage Fittings and Piping: ASME A112.18.1M.
- K. Comply with the following applicable standards and other requirements specified for miscellaneous components:
 - 1. Floor Drains: ASME A112.21.1M.
 - 2. Off-Floor Fixture Supports: ASME A112.6.1M.
 - 3. Pipe Threads: ASME B1.20.1.
 - 4. Plastic Toilet Seats: ANSI Z124.5.
 - 5. Supply and Drain Protective Shielding Guards: ICC A117.1.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

2.2 LAVATORY FAUCETS

- A. Lavatory Faucet: Coordinate faucet inlets with supplies and fixture holes and outlet with spout and fixture receptor.
1. Available Product:
 - a. See Plumbing Schedule on Drawings.

2.3 PRESSURE ASSISTED TANK

- A. Plastic pressure assisted bladder inside vitreous China tank.
1. Available Product:
 - a. Zurn
 - b. Or equal
 2. Trip Mechanism: Chrome plated handle actuator.
 3. Consumption: 1.6 gal./flush.

2.4 TOILET SEATS

- A. Toilet Seat,: Solid plastic.
1. Available Manufacturers:
 - a. Kohler "Lustra" K-4666-C
 - b. Olsonite #95
 - c. American Standard "Church" 9500C
 2. Color: White.

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2.5 FIXTURE SUPPORTS

- A. Lavatory Support: Type II, lavatory carrier with concealed arms and tie rod. Include steel uprights with feet

1. Available Manufacturers:

- a. J.R. Smith 0790
- b. Josam 17115
- c. Zurn Z-1253

2.6 WATER CLOSETS

- A. Water Closets: Vitreous-china fixture designed for pressure assisted tanks flushometer valve operation.

1. Available Products:

- a. Zurn; Z5562 (ADA)
- b. Zurn; Z4472 (Non-ADA)
- c. Or equal

2. Bowl Type: Elongated with siphon-jet design.

- a. Design Consumption: 1.6 gal./flush Insert other.
- b. Color: White.

3. Style: Pressure Assisted Tank.

- a. See Article 2.3

4. Toilet Seat: See Article 2.7

2.7 LAVATORIES

- A. Lavatories: Wall-hanging, vitreous China fixture.

1. Products:

- a. See Plumbing Schedule on Drawings.

PART 3 - EXECUTION

3.1 FIXTURE INSTALLATION

- A. Assemble fixtures, trim, fittings, and other components according to manufacturers' written instructions.
- B. For wall-hanging fixtures, install off-floor supports affixed to building substrate.
 - 1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
 - 2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
 - 3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.
- C. Install back-outlet, wall-hanging fixtures onto waste fitting seals and attach to supports.
- D. Install wall-hanging fixtures with tubular waste piping attached to supports.
- E. Install floor mounting fixtures on closest flanges or other attachments to piping or building substrate.
- F. Install fixtures level and plumb according to manufacturers' written instructions and roughing-in drawings.
- G. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
 - 1. Exception: Use ball valve if stops are not specified with fixture.
- H. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.
- I. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.
- J. Install water closets with handle mounted on the left side of the tank. Install other actuators in locations that are easy for people with disabilities to reach.
- K. Install toilet seats on water closets.
- L. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

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Plumbing Fixtures

- M. Install water-supply, flow-control fittings with specified flow rates in fixture supplies at stop valves.
- N. Install faucet, flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- O. Install traps on fixture outlets.
 - 1. Exception: Omit trap on fixtures with integral traps.
- P. Install escutcheons at piping wall ceiling penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Refer to Section 15050 "Basic Mechanical Materials and Methods" for escutcheons.
- Q. Seal joints between fixtures and walls, floors, and counters using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color.

3.2 CONNECTIONS

- A. Connect water supplies from water distribution piping to fixtures.
- B. Connect drain piping from fixtures to drainage piping.
- C. Supply and Waste Connections to Plumbing Fixtures: Connect fixtures with water supplies, stops, risers, traps, and waste piping. Use size fittings required to match fixtures. Connect to plumbing piping.
- D. Supply and Waste Connections to Fixtures and Equipment Specified in Other Sections: Connect fixtures and equipment with water supplies, stops, risers, traps, and waste piping specified. Use size fittings required to match fixtures and equipment. Connect to plumbing piping.

3.3 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.
- B. Do not allow use of fixtures for temporary facilities unless approved in writing by the State's Representative.

END OF SECTION 15410

SECTION 15530 FURNACES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Furnaces and accessories complete with controls.
 - 2. Direct-expansion cooling coils with refrigerant piping.

1.2 DEFINITIONS

- A. Condensing Furnace: Furnace with annual fuel utilization efficiency rating more than 88 percent; designed to vent saturated flue gas.

1.3 SUBMITTALS

- A. Product Data: Include rated capacities of selected models, furnished specialties, and accessories for each furnace. Include plan and elevation views of units, minimum clearances, and data on ratings and capacities.
- B. Wiring Diagrams: Power, signal, and control wiring.
- C. Operation and maintenance data.

1.4 QUALITY ASSURANCE

- A. Comply with ANSI Z21.47, "Gas-Fired Central Furnaces".

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace furnace heat exchanger and control circuit board that fail in materials and workmanship within 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

Furnaces

2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 GAS-FIRED FURNACES, CONDENSING

- A. Manufacturers:
 1. Bryant Heating & Cooling Systems; Carrier; Div. of United Technologies Corp.
 2. Carrier; Div. of United Technologies Corp.
 3. Lennox Industries, Inc.
 4. Trane Company (The).
 5. Or engineers approved equal.
- B. Description: Factory assembled, piped, wired, and tested; complying with ANSI Z21.47, "Gas-Fired Central Furnaces," and NFPA 54, "National Fuel Gas Code"; and bearing label of American Gas Association.
- C. Cabinet: Steel, with interior insulation around heat exchanger. Lift-out panels expose burners and all other items requiring access for maintenance.
 1. Interior Insulation: Mineral-fiber board thermal insulation manufactured with glass fibers a minimum of 1/2 inch thick, bonded with a thermosetting resin. Comply with ASTM C 612, Type IB, with aluminum foil jacket.
- D. Finish of External Casings and Cabinets: Factory painted, manufacturer's standard color.
- E. Fan: Centrifugal, factory balanced, resilient mounted, direct drive.
- F. Fan Motors: Energy-efficient type as specified in Division 15 Section 15055 "Motors." Open dripproof, with internal thermal protection and permanent lubrication.
- G. Fan Motors: Multitapped, multispeed, with internal thermal protection and permanent lubrication.
- H. Type of Gas: Propane.
- I. Heat Exchanger: Stamped and welded.
 1. Primary: Aluminized steel.
 2. Secondary: Polyethylene-coated steel.
- J. Heat Exchanger:
 1. Primary: Stainless-steel tubing.
 2. Secondary: Stainless-steel tubing with turbulators.

- K. Heat Exchanger:
 - 1. Primary: Stainless-steel tubing.
 - 2. Secondary: Stainless-steel tubing, with turbulators, bonded in aluminum fins.
- L. Heat Exchanger: Cast-iron combustion chamber with aluminized- and stainless-steel tailpipe and decoupler; aluminum-finned, stainless-steel-tube coil; resiliently mounted.
- M. Burner Controls: Solid state; control gas valve and ignition.
 - 1. Gas Valve: 24 V, 100 percent safety gas shutoff, pressure regulator, and manual shutoff.
 - 2. Ignition: Electronic pilot ignition, with electric spark igniter.
- N. Automatic Controls: Solid-state board delays fan start and shutdown.
- O. Accessories:
 - 1. Combination Combustion-Air Intake and Vent: PVC plastic fitting to combine combustion-air inlet and vent through outside wall.
 - 2. Ventilation Air Heat Exchanger: Polyethylene air-to-air heat exchanger.

2.3 CONTROLS

- A. Furnace Controls: Include components required for satisfactory operation of furnaces and auxiliary equipment in all seasons.
- B. Control Transformer: 24-V ac output, factory installed, and wired in furnace.
- C. Cooling Relay: To start condensing unit.
- D. Blower Fan Control: Fan on-automatic.
- E. Blower Fan Control: Staged, low-medium heating and high-speed cooling.
- F. Blower Fan Control: Variable continuous fan-speed control.
- G. Thermostat: 24-V ac, solid-state, programmable, microprocessor-based wall-mounting unit with automatic switching from heating to cooling, preferential rate control, multiple temperature presets selectable by day and time, and battery backup protection of program settings against power failure.
- H. Power wiring is specified in Division 16 Section 16120 "Conductors and Cables." Signal and control wiring are specified in Division 16 Section "Control/Signal Transmission Media."

2.4 AIR FILTERS AND CLEANERS

Furnaces

- A. Filters: 1-inch- thick, disposable, fiberglass type in sheet metal frame.

2.5 PLASTIC VENT MATERIALS

- A. CPVC Plastic, Schedule 40 Pipe: ASTM F 441/F 441M.
 - 1. CPVC Plastic, Schedule 40 Fittings: ASTM F 438, socket type.
 - 2. CPVC Solvent Cement: ASTM F 493.
- B. PVC Plastic, Schedule 40 Pipe: ASTM D 1785.
 - 1. PVC Plastic, Schedule 40 Fittings: ASTM D 2466, socket type.
 - 2. PVC Solvent Cement: ASTM D 2564.

PART 3 - EXECUTION

3.1 FURNACE INSTALLATION

- A. Install gas-fired furnaces and associated fuel and vent features and systems according to 2007 CMC Chapter 9.
- B. Suspended Units: Suspend from structure using threaded rods, spring hangers, and building attachments. Secure rods to unit hanger attachments. Adjust hangers so unit is level and plumb.
 - 1. Install seismic restraints to limit movement of furnace by resisting code-required seismic acceleration.
- C. Base-Mounted Units: Secure units to substrate. Provide optional bottom closure base if required by installation conditions.
 - 1. Anchor furnace to substrate to resist code-required seismic acceleration.
- D. Controls: Install thermostats at mounting height of 60 inches above floor.
- E. Control Wiring: Install control wiring as specified in Division 16 Section "Control/Signal Transmission Media."
- F. Identify furnaces according to Division 15 Section 15050 "Basic Mechanical Materials and Methods."

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect gas piping according to Division 15 Section 15194 "Fuel Gas Piping."

- C. Vent and Outside-Air Connection, Condensing, Gas-Fired Furnaces: Connect plastic piping vent material to furnace connections and extend outdoors. Terminate vent outdoors with a cap and in an arrangement that will protect against entry of birds, insects, and dirt.

- 1. Plastic pipe joint construction is specified in Division 15 Section 15050 "Basic Mechanical Materials and Methods."

- D. Install piping adjacent to machine to allow service and maintenance.

3.3 ADJUSTING

- A. Adjust initial temperature and humidity set points.
- B. Set controls, burner, and other adjustments for optimum heating performance and efficiency. Adjust heat-distribution features, including shutters, dampers, and relays, to provide optimum heating performance and system efficiency.

3.4 CLEANING

- A. After completing installation, clean furnaces internally according to manufacturer's written instructions.
- B. Install new filters in each furnace within 14 days after Substantial Completion.

END OF SECTION 15530

SECTION 15738
SPLIT-SYSTEM AIR-CONDITIONING UNITS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes split-system air-conditioning and heat pump units consisting of separate evaporator-fan and compressor-condenser components. Units are designed for exposed or concealed mounting, and may be connected to ducts.

1.2 DEFINITIONS

- A. Evaporator-Fan Unit: The part of the split-system air-conditioning unit that contains a coil for cooling (heat rejection for heating operation in heat pump units) and a fan to circulate air to conditioned space.
- B. Compressor-Condenser Unit: The part of the split-system air-conditioning unit that contains a refrigerant compressor and a coil for condensing refrigerant (evaporator for heating operation in heat pump units).

1.3 SUBMITTALS

- A. Product Data: Include rated capacities, furnished specialties, and accessories for each unit indicated. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.
- B. Wiring Diagrams: Power, signal, and control wiring.
- C. Operation and maintenance data.

1.4 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace split-system air-conditioning units that fail in materials and workmanship within five years from date of Substantial Completion.

1.5 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Belts: One set.
 - 2. Filters: One set.

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Split-System Air-Conditioning Units

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Carrier Air Conditioning; Div. of Carrier Corp.
 - 2. Lennox Industries Inc.
 - 3. Trane Co. (The); Unitary Products Group.
 - 4. Or engineers approved equal.

2.2 EVAPORATOR-FAN UNIT

- A. Concealed Unit Chassis: Galvanized steel with flanged edges, removable panels for servicing, and insulation on back of panel.
 - 1. Insulation: Faced, glass-fiber duct liner.
 - 2. Drain Pans: Galvanized steel, with connection for drain; insulated.
- B. Floor-Mounting, Unit Cabinet: Enameled steel with removable panels on front and ends.
 - 1. Discharge Grille: Steel with surface-mounted frame.
 - 2. Insulation: Faced, glass-fiber, duct liner.
 - 3. Drain Pans: Galvanized steel, with connection for drain; insulated. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.
- C. Heating Coil: Copper-tube water coil, with mechanically bonded aluminum fins spaced no closer than 0.1 inch; leak tested to 300 psig underwater; and having a 2-position control valve.
- D. Heating Coil: Helical, nickel-chrome, electric-resistance heating elements with refractory ceramic support bushings; automatic-reset thermal cutout; built-in magnetic contactors; manual-reset thermal cutout; airflow proving device; and one-time fuses in terminal box for overcurrent protection.
- E. Evaporator Fan: Forward-curved, double-width wheel of galvanized steel; directly connected to motor.
- F. Fan Motor: Multispeed, PSC type.

- G. Disposable Filters: 1 inch thick.
- H. Wiring Terminations: Connect motor to chassis wiring with plug connection.

2.3 AIR-COOLED, COMPRESSOR-CONDENSER UNIT

- A. Casing steel, finished with baked enamel, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
- B. Compressor: Hermetically sealed scroll type with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
- C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid subcooler.
- D. Heat Pump Components: Reversing valve and low-temperature air cut-off thermostat.
- E. Fan: Aluminum-propeller type, directly connected to motor.
- F. Motor: Permanently lubricated, with integral thermal-overload protection.
- G. Low Ambient Kit: Permits operation down to 45 deg F.
- H. Mounting Base: Polyethylene.

2.4 ACCESSORIES

- A. Thermostat: Low voltage with subbase to control compressor and evaporator fan.
- B. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.
- B. Install ground-mounted, compressor-condenser components on 4-inch- thick, reinforced concrete base; 4 inches larger on each side than unit. Concrete, reinforcement, and formwork are specified in Division 3 Section 03300 "Cast-in-Place Concrete." Coordinate anchor installation with concrete base.

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Split-System Air-Conditioning Units

- C. Install ground-mounted, compressor-condenser components on polyethylene mounting base.
- D. Install compressor-condenser components on restrained, spring isolators with a minimum static deflection of 1 inch. Refer to Division 15 Section 15071 "Mechanical Vibration and Seismic Controls."

3.2 CONNECTIONS

- A. Connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.
- B. Install piping adjacent to unit to allow service and maintenance.
- C. Unless otherwise indicated, connect piping with unions and shutoff valves to allow units to be disconnected without draining piping. Refer to piping system Sections for specific valve and specialty arrangements.

3.3 FIELD QUALITY CONTROL

- A. Installation Inspection: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including piping and electrical connections, and to prepare a written report of inspection.
- B. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
- C. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new components, and retest.
- D. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

END OF SECTION 15738

SECTION 15815 METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes metal, rectangular ducts and fittings for supply, return, outside, and exhaust air-distribution systems in pressure classes from minus 2- to plus 10-inch wg.
- B. See Division 15 Section 15820 "Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.2 SUBMITTALS

- A. Shop Drawings: Show fabrication and installation details for metal ducts.
 - 1. Penetrations through fire-rated and other partitions.
 - 2. Duct accessories, including access doors and panels.

1.3 QUALITY ASSURANCE

- A. NFPA Compliance:
- B. 2007 California Mechanical Code, (CMC)

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 SHEET METAL MATERIALS

- A. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

Metal Ducts

- B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G90 coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.
- C. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts.
- D. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 SEALANT MATERIALS

- A. Joint and Seam Tape: 2 inches wide; glass-fiber-reinforced fabric.
- B. Tape Sealing System: Woven-fiber tape impregnated with gypsum mineral compound and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
- C. Water-Based Joint and Seam Sealant: Flexible, adhesive sealant, resistant to UV light when cured, UL 723 listed, and complying with CMC requirements for Class 1 ducts.
- D. Solvent-Based Joint and Seam Sealant: One-part, nonsag, solvent-release-curing, polymerized butyl sealant formulated with a minimum of 75 percent solids.
- E. Flanged Joint Mastic: One-part, acid-curing, silicone, elastomeric joint sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use O.
- F. Flange Gaskets: Butyl rubber or EPDM polymer with polyisobutylene plasticizer.

2.4 HANGERS AND SUPPORTS

- A. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 - 2. Exception: Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
- B. Hanger Materials: Galvanized sheet steel or threaded steel rod.
 - 1. Hangers Installed in Corrosive Atmospheres: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

2. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for steel sheet width and thickness and for steel rod diameters.
- C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- D. Trapeze and Riser Supports: Galvanized-steel shapes and plates complying with ASTM A 36/A 36M.

2.5 RECTANGULAR DUCT FABRICATION

- A. Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" and complying with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.
 1. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure class.
 2. Deflection: Duct systems shall not exceed deflection limits according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."
- B. Transverse Joints: Prefabricated slide-on joints and components constructed using manufacturer's guidelines for material thickness, reinforcement size and spacing, and joint reinforcement.
 1. Manufacturers:
 - a. Ductmate Industries, Inc.
 - b. Nexus Inc.
 - c. Ward Industries, Inc.
- C. Formed-On Flanges: Construct according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," Figure 1-4, using corner, bolt, cleat, and gasket details.
 1. Manufacturers:
 - a. Ductmate Industries, Inc.
 - b. Lockformer.
 2. Duct Size: Maximum 30 inches wide and up to 2-inch wg pressure class.
 3. Longitudinal Seams: Pittsburgh lock sealed with noncuring polymer sealant.

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Metal Ducts

- D. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches and larger and 0.0359 inch thick or less, with more than 10 sq. ft. of nonbraced panel area unless ducts are lined.

PART 3 - EXECUTION

3.1 DUCT APPLICATIONS

- A. Static-Pressure Classes: Unless otherwise indicated, construct ducts according to the following:
 - 1. Supply Ducts: 1-inch wg.
 - 2. Return Ducts (Negative Pressure): 1/2-inch wg.
 - 3. Exhaust Ducts (Negative Pressure): 1-inch wg.

3.2 DUCT INSTALLATION

- A. Construct and install ducts according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," unless otherwise indicated.
- B. Install ducts with fewest possible joints.
- C. Install fabricated fittings for changes in directions, size, and shape and for connections.
- D. Install couplings tight to duct wall surface with a minimum of projections into duct. Secure couplings with sheet metal screws. Install screws at intervals of 12 inches, with a minimum of 3 screws in each coupling.
- E. Install ducts, unless otherwise indicated, vertically and horizontally and parallel and perpendicular to building lines; avoid diagonal runs.
- F. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- G. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- H. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions unless specifically indicated.
- I. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.
- J. Seal all joints and seams. Apply sealant to male end connectors before insertion, and afterward to cover entire joint and sheet metal screws.

- K. Electrical Equipment Spaces: Route ducts to avoid passing through transformer vaults and electrical equipment spaces and enclosures.
- L. Non-Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls and are exposed to view, conceal spaces between construction openings and ducts or duct insulation with sheet metal flanges of same metal thickness as ducts. Overlap openings on 4 sides by at least 1-1/2 inches.
- M. Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, install appropriately rated fire dampers, sleeves, and firestopping sealant. Fire and smoke dampers are specified in Division 15 Section 15820 "Duct Accessories." Firestopping materials and installation methods are specified in Division 7 Section 07841 "Through-Penetration Firestop Systems."
- N. Protect duct interiors from the elements and foreign materials until building is enclosed. Follow SMACNA's "Duct Cleanliness for New Construction."

3.3 SEAM AND JOINT SEALING

- A. Seal duct seams and joints according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for duct pressure class indicated.
 - 1. For pressure classes lower than 2-inch wg, seal transverse joints.
- B. Seal ducts before external insulation is applied.

3.4 HANGING AND SUPPORTING

- A. Support horizontal ducts within 24 inches of each elbow and within 48 inches of each branch intersection.
- B. Support vertical ducts at maximum intervals of 16 feet and at each floor.
- C. Install upper attachments to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.
- D. Install concrete inserts before placing concrete.
- E. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 - 1. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.

3.5 CONNECTIONS

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- A. Make connections to equipment with flexible connectors according to Division 15 Section 15820 "Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

END OF SECTION 15815

SECTION 15820 DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Backdraft dampers.
 - 2. Volume dampers.
 - 3. Turning vanes.
 - 4. Duct-mounting access doors.
 - 5. Flexible connectors.
 - 6. Flexible ducts.
 - 7. Duct accessory hardware.
- B. See Division 15 Section 15900 "HVAC Instrumentation and Controls" for electric and pneumatic damper actuators.

1.2 SUBMITTALS

- A. Product Data: For the following:
 - 1. Backdraft dampers.
 - 2. Volume dampers.
 - 3. Turning vanes.
 - 4. Duct-mounting access doors.
 - 5. Flexible connectors.
 - 6. Flexible ducts.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Special fittings.
 - 2. Manual-volume damper installations.
 - 3. Fire-damper, smoke-damper, and combination fire- and smoke-damper installations, including sleeves and duct-mounting access doors.
 - 4. Wiring Diagrams: Power, signal, and control wiring.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

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Duct Accessories

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 SHEET METAL MATERIALS

- A. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated.
- B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G90 coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.
- C. Stainless Steel: ASTM A 480/A 480M.
- D. Aluminum Sheets: ASTM B 209, alloy 3003, temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.
- E. Extruded Aluminum: ASTM B 221, alloy 6063, temper T6.
- F. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- G. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 BACKDRAFT DAMPERS

- A. Manufacturers:
 1. Air Balance, Inc.
 2. American Warming and Ventilating.
 3. CESCO Products.
 4. Duro Dyne Corp.
 5. Greenheck.
 6. Penn Ventilation Company, Inc.
 7. Prefco Products, Inc.
 8. Ruskin Company.
 9. Vent Products Company, Inc.
- B. Description: Multiple-blade, parallel action gravity balanced, with blades of maximum 6-inch width, with sealed edges, assembled in rattle-free manner with 90-degree stop, steel ball bearings, and axles; adjustment device to permit setting for varying differential static pressure.

- C. Frame: 0.052-inch- thick, galvanized sheet steel, with welded corners.
- D. Blades: 0.050-inch- thick aluminum sheet.
- E. Blade Seals: Neoprene.
- F. Blade Axles: Galvanized steel.
- G. Tie Bars and Brackets: Galvanized steel.
- H. Return Spring: Adjustable tension.

2.4 VOLUME DAMPERS

- A. Manufacturers:
 - 1. Air Balance, Inc.
 - 2. American Warming and Ventilating.
 - 3. Flexmaster U.S.A., Inc.
 - 4. McGill AirFlow Corporation.
 - 5. METALAIRE, Inc.
 - 6. Nailor Industries Inc.
 - 7. Penn Ventilation Company, Inc.
 - 8. Ruskin Company.
 - 9. Vent Products Company, Inc.
- B. General Description: Factory fabricated, with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class.
- C. Standard Volume Dampers: Multiple- or single-blade, parallel- or opposed-blade design as indicated, standard leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.
 - 1. Steel Frames: Hat-shaped, galvanized sheet steel channels, minimum of 0.064 inch thick, with mitered and welded corners; frames with flanges where indicated for attaching to walls and flangeless frames where indicated for installing in ducts.
 - 2. Roll-Formed Steel Blades: 0.064-inch- thick, galvanized sheet steel.
 - 3. Blade Axles: Galvanized steel.
 - 4. Bearings: Stainless-steel sleeve.
 - 5. Tie Bars and Brackets: Galvanized steel.
- D. Jackshaft: 1-inch- diameter, galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.

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Duct Accessories

1. Length and Number of Mountings: Appropriate to connect linkage of each damper in multiple-damper assembly.
- E. Damper Hardware: Zinc-plated, die-cast core with dial and handle made of 3/32-inch- thick zinc-plated steel, and a 3/4-inch hexagon locking nut. Include center hole to suit damper operating-rod size. Include elevated platform for insulated duct mounting.

2.5 TURNING VANES

- A. Fabricate to comply with SMACNA's "HVAC Duct Construction Standards-- Metal and Flexible" for vanes and vane runners. Vane runners shall automatically align vanes.
- B. Manufactured Turning Vanes: Fabricate 1-1/2-inch- wide, double-vane, curved blades of galvanized sheet steel set 3/4 inch o.c.; support with bars perpendicular to blades set 2 inches o.c.; and set into vane runners suitable for duct mounting.
 1. Manufacturers:
 - a. Ductmate Industries, Inc.
 - b. Duro Dyne Corp.
 - c. METALAIRE, Inc.
 - d. Ward Industries, Inc.
- C. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

2.6 DUCT-MOUNTING ACCESS DOORS

- A. General Description: Fabricate doors airtight and suitable for duct pressure class.
- B. Door: Double wall, duct mounting, and rectangular; fabricated of galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class. Include vision panel where indicated. Include 1-by-1-inch butt or piano hinge and cam latches.
 1. Manufacturers:
 - a. American Warming and Ventilating.
 - b. CESCO Products.
 - c. Ductmate Industries, Inc.
 - d. Flexmaster U.S.A., Inc.
 - e. Greenheck.
 - f. McGill AirFlow Corporation.
 - g. Nailor Industries Inc.

- h. Ventfabrics, Inc.
 - i. Ward Industries, Inc.
 - 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
 - 3. Provide number of hinges and locks as follows:
 - a. Less Than 12 Inches Square: Secure with two sash locks.
 - b. Up to 18 Inches Square: Two hinges and two sash locks.
 - c. Up to 24 by 48 Inches: Three hinges and two compression latches.
 - d. Sizes 24 by 48 Inches and Larger: One additional hinge.
 - C. Door: Double wall, duct mounting, and round; fabricated of galvanized sheet metal with insulation fill and 1-inch thickness. Include cam latches.
 - 1. Manufacturers:
 - a. Flexmaster U.S.A., Inc.
 - 2. Frame: Galvanized sheet steel, with spin-in notched frame.
 - D. Seal around frame attachment to duct and door to frame with neoprene or foam rubber.
 - E. Insulation: 1-inch- thick, fibrous-glass or polystyrene-foam board.
- 2.7 FLEXIBLE CONNECTORS
- A. Manufacturers:
 - 1. Duro Dyne Corp.
 - 2. Ventfabrics, Inc.
 - 3. Ward Industries, Inc.
 - B. General Description: Flame-retardant or noncombustible fabrics, coatings, and adhesives complying with UL 181, Class 1.
 - C. Flexible Connector Fabric: Glass fabric double coated with neoprene.
 - 1. Minimum Weight: 26 oz./sq. yd..
 - 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
 - 3. Service Temperature: Minus 40 to plus 200 deg F.
- 2.8 FLEXIBLE DUCTS
- A. Manufacturers:
 - 1. Ductmate Industries, Inc.
 - 2. Flexmaster U.S.A., Inc.
 - 3. Hart & Cooley, Inc.

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4. McGill AirFlow Corporation.
- B. Noninsulated-Duct Connectors: UL 181, Class 1, multiple layers of aluminum laminate supported by helically wound, spring-steel wire.
 1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
 2. Maximum Air Velocity: 4000 fpm.
 3. Temperature Range: Minus 20 to plus 210 deg F.
- C. Insulated-Duct Connectors: UL 181, Class 1, 2-ply vinyl film supported by helically wound, spring-steel wire; fibrous-glass insulation; aluminized vapor barrier film.
 1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
 2. Maximum Air Velocity: 4000 fpm.
 3. Temperature Range: Minus 10 to plus 160 deg F.
- D. Flexible Duct Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action, in sizes 3 through 18 inches to suit duct size.

2.9 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct insulation thickness.
- B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 APPLICATION AND INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Provide duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Install backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

- D. Install volume dampers in ducts with liner; avoid damage to and erosion of duct liner.
- E. Provide balancing dampers at points on supply, return, and exhaust systems where branches lead from larger ducts as required for air balancing. Install at a minimum of two duct widths from branch takeoff.
- F. Provide test holes at fan inlets and outlets and elsewhere as indicated.
- G. Install duct access doors to allow for inspecting, adjusting, and maintaining accessories and terminal units as follows:
 - 1. On both sides of duct coils.
 - 2. Downstream from volume dampers, turning vanes, and equipment.
 - 3. To interior of ducts for cleaning; before and after each change in direction, at maximum 50-foot spacing.
 - 4. On sides of ducts where adequate clearance is available.
- H. Install the following sizes for duct-mounting, rectangular access doors:
 - 1. One-Hand or Inspection Access: 8 by 5 inches.
 - 2. Two-Hand Access: 12 by 6 inches.
 - 3. Head and Hand Access: 18 by 10 inches.
 - 4. Head and Shoulders Access: 21 by 14 inches.
 - 5. Body Access: 25 by 14 inches.
 - 6. Body Plus Ladder Access: 25 by 17 inches.
- I. Install the following sizes for duct-mounting, round access doors:
 - 1. One-Hand or Inspection Access: 8 inches in diameter.
 - 2. Two-Hand Access: 10 inches in diameter.
 - 3. Head and Hand Access: 12 inches in diameter.
 - 4. Head and Shoulders Access: 18 inches in diameter.
 - 5. Body Access: 24 inches in diameter.
- J. Label access doors according to Division 15 Section 15075 "Mechanical Identification."
- K. Install flexible connectors immediately adjacent to equipment in ducts associated with fans and motorized equipment supported by vibration isolators.
- L. For fans developing static pressures of 5-inch wg and higher, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
- M. Connect terminal units to supply ducts directly or with maximum 12-inch lengths of flexible duct. Do not use flexible ducts to change directions.

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- N. Connect diffusers or light troffer boots to low pressure ducts directly or with maximum 60-inch lengths of flexible duct clamped or strapped in place.
- O. Connect flexible ducts to metal ducts with liquid adhesive plus tape.
- P. Install duct test holes where indicated and required for testing and balancing purposes.

3.2 ADJUSTING

- A. Adjust duct accessories for proper settings.
- B. Adjust fire and smoke dampers for proper action.
- C. Final positioning of manual-volume dampers is specified in Division 15 Section 15990 "Testing, Adjusting, and Balancing."

END OF SECTION 15820

SECTION 15855
DIFFUSERS, REGISTERS, AND GRILLES.

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following ceiling and wall mounted air outlets and inlets:
 - 1. Diffusers.
 - 2. Registers
 - 3. Grilles.

1.2 SUBMITTALS

- A. Product Data: For each model indicated, include the following:
 - 1. Data Sheet: Indicate construction, finish, and mounting details for each type of air outlet, inlet, and accessory indicated.
 - 2. Performance Data: Include throw and drop, static-pressure drop, and noise ratings for each type of air outlet and inlet indicated.
 - 3. Schedule of diffusers, registers, and grilles indicating drawing designation, room location, quantity, model number, size, and accessories.
 - 4. Assembly Drawing: Indicate materials and methods of assembly of components for each type of air outlet and inlet indicated.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraphs titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products specified.
 - 2. Products: Subject to compliance with requirements, provide one of the products specified.

2.2 DIFFUSERS

- A. Diffuser
 - 1. Products:

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Diffusers, Registers, and Grilles

- a. Air Systems Components, Krueger Div.
- b. Anemostat Products, Dynamics Corp. of America
- c. Carnes Co. Inc.
- d. Hart & Cooley, Inc., Hart & Cooley Div.
- e. Hart & Cooley, Inc., Tuttle & Bailey Div.
- f. Nailor Industries Inc.
- g. Titus

2.3 REGISTERS

A. Register

1. Products:

- a. Air Systems Components, Krueger Div.
- b. Anemostat Products, Dynamics Corp. of America
- c. Carnes Co. Inc.
- d. Hart & Cooley, Inc., Hart & Cooley Div.
- e. Hart & Cooley, Inc., Tuttle & Bailey Div.
- f. Nailor Industries Inc.
- g. Titus

2.4 GRILLES

A. Grille

1. Products:

- a. Air Systems Components, Krueger Div.
- b. Anemostat Products, Dynamics Corp. of America
- c. Carnes Co. Inc.
- d. Hart & Cooley, Inc., Hart & Cooley Div.
- e. Hart & Cooley, Inc., Tuttle & Bailey Div.
- f. Nailor Industries Inc.
- g. Titus

2.5 SOURCE QUALITY CONTROL

- A. Testing:** Test performance according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Ceiling-Mounted Outlets and Inlets:** Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow

pattern, throw, and pressure drop. Make final locations where indicated, as much as practicable. For units installed in lay-in ceiling panels, locate units in the center of the panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

- B. Install diffusers, registers, and grilles with airtight connection to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

END OF SECTION 15855

SECTION 15940

SEQUENCE OF OPERATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes control sequences for HVAC systems, subsystems, and equipment.

1.2 SUBMITTALS

- A. Shop Drawings: Written descriptions and diagrams of operational sequences.

1.3 SINGLE-ZONE, SINGLE-DUCT, CONSTANT-VOLUME, AIR-HANDLING UNIT CONTROL SEQUENCES

- A. Fan Control: System starts fan to run continuously during occupied periods. Room thermostat cycles fan during unoccupied periods.
 - 1. Signal alarm if fan fails to start as commanded.
- B. Freeze Protection: Duct-mounted thermostat, located before supply fan, signals alarm, stops fan, and closes outside-air dampers when temperature falls below 37 deg F.
- C. High-Temperature Protection: Duct-mounted thermostat, located in return air, signals alarm, stops fan, and closes outside-air dampers when temperature rises above 300 deg F.
- D. Operator Station Display: Indicate the following on operator workstation display terminal:
 - 1. System graphic.
 - 2. System on-off indication.
 - 3. System occupied/unoccupied mode.
 - 4. Heating and Cooling-coil air-temperature indication.
 - 5. Heating and Cooling-coil air-temperature set point.

1.4 VENTILATION SEQUENCES

- A. Exhaust Fan: Occupancy sensor cycles fan.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 15940

SECTION 15990
TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes testing, adjusting, and balancing HVAC systems to produce design objectives, including the following:
 - 1. Balancing airflow and water flow within distribution systems, including submains, branches, and terminals, to indicated quantities according to specified tolerances.
 - 2. Adjusting total HVAC systems to provide indicated quantities.
 - 3. Measuring electrical performance of HVAC equipment.
 - 4. Setting quantitative performance of HVAC equipment.
 - 5. Verifying that automatic control devices are functioning properly.
 - 6. Measuring sound and vibration.
 - 7. Reporting results of activities and procedures specified in this Section.

1.2 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. AMCA: Air Movement and Control Association.
- C. CTI: Cooling Tower Institute.
- D. NEBB: National Environmental Balancing Bureau.
- E. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.

1.3 SUBMITTALS

- A. Strategies and Procedures Plan: Testing, adjusting, and balancing strategies and step-by-step procedures. Include a complete set of report forms intended for use on this Project.
- B. Certified Testing, Adjusting, and Balancing Reports: Prepared on approved forms certified by the testing, adjusting, and balancing Agent.

1.4 QUALITY ASSURANCE

- A. Agent Qualifications: Engage a testing, adjusting, and balancing agent certified by AABC or NEBB.

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Testing, Adjusting, and Balancing

- B. Certification of Testing, Adjusting, and Balancing Reports: Certify testing, adjusting, and balancing field data reports. This certification includes the following:
 - 1. Review field data reports to validate accuracy of data and to prepare certified testing, adjusting, and balancing reports.
 - 2. Certify that testing, adjusting, and balancing team complied with approved testing, adjusting, and balancing plan and procedures specified and referenced in this Specification.
- C. Testing, Adjusting, and Balancing Reports: Use standard forms from NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems."
- D. As described in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems," Section II, "Required Instrumentation for NEBB Certification."
- E. Instrumentation Calibration: Calibrate instruments at least every six months or more frequently if required by the instrument manufacturer.

1.5 PROJECT CONDITIONS

- A. Full Owner Occupancy: The Owner will occupy the site and existing building during the entire testing, adjusting, and balancing period. Cooperate with the Owner during testing, adjusting, and balancing operations to minimize conflicts with the Owner's operations.
- B. Partial Owner Occupancy: The Owner may occupy completed areas of the building before Substantial Completion. Cooperate with the Owner during testing, adjusting, and balancing operations to minimize conflicts with the Owner's operations.

1.6 COORDINATION

- A. Coordinate efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist testing, adjusting, and balancing activities.
- B. Perform testing, adjusting, and balancing after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

1.7 WARRANTY

- A. National Project Performance Guarantee: Provide a guarantee on AABC'S "National Standards" forms stating that AABC will assist in completing the requirements of the Contract Documents if the testing, adjusting, and balancing

Agent fails to comply with the Contract Documents. Guarantee includes the following provisions:

- B. Special Guarantee: Provide a guarantee on NEBB forms stating that NEBB will assist in completing the requirements of the Contract Documents if the testing, adjusting, and balancing Agent fails to comply with the Contract Documents. Guarantee includes the following provisions:
 - 1. The certified Agent has tested and balanced systems according to the Contract Documents.
 - 2. Systems are balanced to optimum performance capabilities within design and installation limits.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with project requirements and to discover conditions in systems' designs that may preclude proper testing, adjusting, and balancing of systems and equipment.
 - 1. Verify that balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.
- B. Examine approved submittal data of HVAC systems and equipment.
- C. Examine Project Record Documents described in Division 1 Section 01781 "Project Record Documents."
- D. Examine equipment performance data, including fan and pump curves. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system. Calculate system effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from those presented when equipment was performance tested at the factory. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," Sections 7 through 10; or in SMACNA's "HVAC Systems--Duct Design," Sections 5 and 6. Compare this data with design data and installed conditions.

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- E. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Specification Sections have been performed.
- F. Examine system and equipment test reports.
- G. Examine HVAC system and equipment installations to verify that indicated balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are properly installed, and their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.
- H. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.
- I. Examine air-handling equipment to ensure clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
- J. Examine terminal units, such as variable-air-volume boxes and mixing boxes, to verify that they are accessible and their controls are connected and functioning.
- K. Examine plenum ceilings, utilized for supply air, to verify that they are airtight. Verify that pipe penetrations and other holes are sealed.
- L. Examine strainers for clean screens and proper perforations.
- M. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.
- N. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
- O. Examine open-piping-system pumps to ensure absence of entrained air in suction piping.
- P. Examine equipment for installation and for properly operating safety interlocks and controls.
- Q. Examine automatic temperature system components to verify the following:
 - 1. Dampers, valves, and other controlled devices operate by the intended controller.
 - 2. Dampers and valves are in the position indicated by the controller.
 - 3. Integrity of valves and dampers for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in multizone units, mixing boxes, and variable-air-volume terminals.

4. Automatic modulating and shutoff valves, including two-way valves and three-way mixing and diverting valves, are properly connected.
5. Thermostats and humidistats are located to avoid adverse effects of sunlight, drafts, and cold walls.
6. Sensors are located to sense only intended conditions.
7. Sequence of operation for control modes is according to the Contract Documents.
8. Controller set points are set at design values. Observe and record system reactions to changes in conditions. Record default set points if different from design values.
9. Interlocked systems are operating.
10. Changeover from heating to cooling mode occurs according to design values.

- R. Report deficiencies discovered before and during performance of testing, adjusting, and balancing procedures.

3.2 PREPARATION

- A. Prepare a testing, adjusting, and balancing plan that includes strategies and step-by-step procedures.
- B. Complete system readiness checks and prepare system readiness reports. Verify the following:
1. Permanent electrical power wiring is complete.
 2. Hydronic systems are filled, clean, and free of air.
 3. Automatic temperature-control systems are operational.
 4. Equipment and duct access doors are securely closed.
 5. Balance, smoke, and fire dampers are open.
 6. Isolating and balancing valves are open and control valves are operational.
 7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
 8. Windows and doors can be closed so design conditions for system operations can be met.

3.3 TESTING AND BALANCING PROCEDURES

- A. Perform testing and balancing procedures on each system according to procedures contained in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems."
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to the insulation Specifications for this Project.

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- C. Mark equipment settings with paint or other suitable, permanent identification material, including damper-control positions, valve indicators, fan-speed-control levers, and similar controls and devices, to show final settings.

3.4 TOLERANCES

- A. Set HVAC system airflow and water flow rates within the following tolerances:
 - 1. Supply, Return, and Exhaust Fans: Plus 5 to plus 10 percent.
 - 2. Air Outlets and Inlets: 0 to minus 10 percent.
 - 3. Heating-Water Flow Rate: 0 to minus 10 percent.
 - 4. Cooling-Water Flow Rate: 0 to minus 5 percent.

3.5 REPORTS

- A. Status Reports: As Work progresses, prepare reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.
- B. Final Report: Typewritten, or computer printout in letter-quality font, on standard bond paper, bound in three-ring, loose-leaf binder, and tabulated and divided into sections by tested and balanced systems.
 - 1. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing agent.
 - 2. Include a list of instruments used for procedures, along with proof of calibration.
 - 3. Final Report Contents: In addition to certified field report data, include the following:
 - a. Pump curves.
 - b. Fan curves.
 - c. Manufacturers' test data.
 - d. Field quality-control test reports prepared by system and equipment installers.
 - e. Other information relative to equipment performance, but do not include approved Shop Drawings and Product Data.
 - 4. General Report Data: In addition to form titles and entries, include the following data in the final report, as applicable:
 - a. Title page.
 - b. Name and address of testing, adjusting, and balancing Agent.
 - c. Project name.
 - d. Project location.
 - e. Architect's name and address.

- f. Engineer's name and address.
 - g. Contractor's name and address.
 - h. Report date.
 - i. Signature of testing, adjusting, and balancing Agent who certifies the report.
 - j. Summary of contents, including the following:
 - 1) Design versus final performance.
 - 2) Notable characteristics of systems.
 - 3) Description of system operation sequence if it varies from the Contract Documents.
 - k. Nomenclature sheets for each item of equipment.
 - l. Data for terminal units, including manufacturer, type size, and fittings.
 - m. Notes to explain why certain final data in the body of reports vary from design values.
 - n. Test conditions for fans and pump performance forms, including the following:
 - 1) Settings for outside-, return-, and exhaust-air dampers.
 - 2) Conditions of filters.
 - 3) Cooling coil, wet- and dry-bulb conditions.
 - 4) Face and bypass damper settings at coils.
 - 5) Fan drive settings, including settings and percentage of maximum pitch diameter.
 - 6) Inlet vane settings for variable-air-volume systems.
 - 7) Settings for supply-air, static-pressure controller.
 - 8) Other system operating conditions that affect performance.
5. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present with single-line diagrams and include the following:
- a. Quantities of outside, supply, return, and exhaust airflows.
 - b. Water and steam flow rates.
 - c. Duct, outlet, and inlet sizes.
 - d. Pipe and valve sizes and locations.
 - e. Terminal units.
 - f. Balancing stations.

3.6 ADDITIONAL TESTS

- A. Within 90 days of completing testing, adjusting, and balancing, perform additional testing and balancing to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

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- B. Seasonal Periods: If initial testing, adjusting, and balancing procedures were not performed during near-peak summer and winter conditions, perform additional inspections, testing, and adjusting during near-peak summer and winter conditions.

END OF SECTION 15990