

**SUBMITTAL TO THE BOARD OF SUPERVISORS  
COUNTY OF RIVERSIDE, STATE OF CALIFORNIA**



**ITEM: 3.9  
(ID # 14780)**

**MEETING DATE:**  
Tuesday, May 11, 2021

**FROM:** FACILITIES MANAGEMENT AND RIVERSIDE COUNTY FIRE DEPARTMENT:

**SUBJECT:** FACILITIES MANAGEMENT (FM) AND RIVERSIDE COUNTY FIRE DEPARTMENT: Riverside County Fire Department Station # 77 - Lake Riverside Expansion Project - Approval of Revised Plans and Specifications to Re-Advertise for Bids, District 3. [\$0 – Development Impact Fees – Western Riverside County Fire Facilities Fund 30505 – 100%] (Clerk to Advertise for Bids)

**RECOMMENDED MOTION:** That the Board of Supervisors:

1. Reject all bids, approve the revised plans and specifications for the bidding and construction of the Riverside County Fire Department Station # 77 – Lake Riverside Expansion (Fire Station # 77 – Lake Riverside Expansion) Project using the approved pre-qualified list of General County Facilities Level 1 Contractors and authorize the Clerk of the Board to re-advertise for bids;

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**ACTION: Policy, Clerk to Advertise, CIP**

  
Rose Salgado, Director of Facilities Management 4/15/2021   
Diane Sinclair, Deputy Director-Fire Admin 4/16/2021

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**MINUTES OF THE BOARD OF SUPERVISORS**

On motion of Supervisor Hewitt, seconded by Supervisor Spiegel and duly carried by unanimous vote, IT WAS ORDERED that the above matter is approved as recommended.

Ayes: Jeffries, Spiegel, Washington, Perez, and Hewitt  
Nays: None  
Absent: None  
Date: May 11, 2021  
xc: FM, Fire, COB

Kecia R. Harper  
Clerk of the Board

By:   
Deputy

**SUBMITTAL TO THE BOARD OF SUPERVISORS COUNTY OF RIVERSIDE,  
STATE OF CALIFORNIA**

**RECOMMENDED MOTION:** That the Board of Supervisors:

2. Upon completion of the bid process, authorize the Director of Facilities Management to submit the contract for award of the bid for construction to the lowest responsive and responsible bidder in a not to exceed amount of \$1,100,000 for the Project, to the Chair of the Board, and authorize the Chair to execute the contract on behalf of the Board of Supervisors (Board), provided that, if any of the following occur, the award will be submitted to the Board for action: there is a bid protest, the lowest bid exceeds the estimated construction budget, the low bidder is disqualified, two or more bids are the same and are the lowest, or a bidder requests relief from its bid due to an error; and
3. Authorize the Director of Facilities Management to administer the contract for the awarded low bidder in accordance with applicable Board policies.

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**SUBMITTAL TO THE BOARD OF SUPERVISORS COUNTY OF RIVERSIDE,  
STATE OF CALIFORNIA**

<b>FINANCIAL DATA</b>	<b>Current Fiscal Year:</b>	<b>Next Fiscal Year:</b>	<b>Total Cost:</b>	<b>Ongoing Cost</b>
<b>COST</b>	\$ 0	\$ 0	\$ 0	\$ 0
<b>NET COUNTY COST</b>	\$ 0	\$ 0	\$ 0	\$ 0
<b>SOURCE OF FUNDS:</b> Development Impact Fees - Western Riverside County Fire Facilities Fund 30505 – 100% (Previously Approved budget)			<b>Budget Adjustment:</b> No	
			<b>For Fiscal Year:</b> 2020/21	

**C.E.O. RECOMMENDATION:** Approve.

**BACKGROUND:**

**Summary**

On March 7, 2017, Item 3.32, the Board of Supervisors (Board) approved in-principle and the project budget in the amount of \$1,765,880 for the Fire Station # 77 – Lake Riverside Expansion Project. The Project will construct a new two bay fire engine facility to replace the existing garage. It will have the capability of housing up to four fire engines, additional area for restrooms, a workshop, storage, laundry and locker room.

On May 1, 2018, Item 3.10, the Board approved the plans and specifications to advertise for bids; approved the Project under the California Environmental Quality Act and adopted the Mitigated Negative Declaration for the Initial Study which was circulated for the mandated 20-day public review period from December 4, 2017 to December 23, 2017. There were no public comments received during the review period. Since the filing of the Notice of Determination, no new substantial changes have occurred to the project, to circumstances surrounding the project, and no new information has occurred which could potentially result in new significant effects. As no changes and additions are occurring, an Addendum would also not be required and no further environmental review is necessary.

On November 15, 2018, a bid opening was conducted and Facilities Management (FM) received two bids which exceeded the approved construction budget of \$1,100,000.

On June 4, 2019, Item 3.7, the Board approved the 2019 Pre-Qualified list of General Contractors for General County Facilities Level 1. FM requests the Board approve the revised plans and specifications and authorize the Clerk of the Board to re-advertise the Notice Inviting Bids for the Project and solicit bids from the 2019 Pre-Qualified General County Facilities Level 1 contractors list. FM will return to the Board under separate cover for award of the lowest responsible bidder's construction contract and revised project budget if needed.

**SUBMITTAL TO THE BOARD OF SUPERVISORS COUNTY OF RIVERSIDE,  
STATE OF CALIFORNIA**

**Impact on Residents and Businesses**

The Fire Station # 77 - Lake Riverside Expansion Project will enhance fire protection services throughout the community of Aguanga.

**Additional Fiscal Information**

The Board previously approved the project budget on March 7, 2017 (Item 3.32) in the amount of \$1,765,880. The Project is 100% funded by DIF Western Riverside County Fire Facilities Fund 30505. There are no costs associated with this Board action.

Attachment:

- Revised Specifications for the Fire Station # 77 – Lake Riverside Expansion Project

RS:VC:SP:RB:ES:mg                      FM08270007841                      MT# 14780  
G:\Project Management Office\FORM 11'S\FORM 11's\_In Process\14780\_D5 - 007841 - RivCo Fire Dept. Stn. 77 Lake Riv Expsn  
Proj - Approval of Rev Plans & Specs to Re-Adv for Bids\_051121.doc

  
Steven Atkeson

5/3/2021

  
Gregory V. Priamos, Director County Counsel

4/20/2021

SPECIFICATIONS AND CONTRACT DOCUMENTS  
FOR

FM08270007841

RIVERSIDE COUNTY FIRE DEPARTMENT STATION # 77 - LAKE  
RIVERSIDE EXPANSION PROJECT



PREPARED BY  
COUNTY OF RIVERSIDE  
FACILITIES MANAGEMENT

FORM APPROVED COUNTY COUNSEL  
BY: Synthia M. Gunzel 4.13.21  
SYNTHIA M. GUNZEL DATE

MAY 11 2021 3.9 PLS

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## **NOTICE INVITING BIDS**

**NOTICE IS HEREBY GIVEN** that the County of Riverside ("County") invites sealed Bids for the construction of the following project ("Work"):

### **RIVERSIDE COUNTY FIRE DEPARTMENT STATION # 77 - LAKE RIVERSIDE EXPANSION PROJECT**

Bids shall be prepared in conformance with the Instructions to Bidders and other Bidding Documents. Bids must be received, by hand delivery or mail, by the Clerk of the Board located on the 1<sup>st</sup> floor of the County Administrative Center, 4080 Lemon Street, Riverside, CA 92501, no later than the Bid Closing Deadline of **1:00 p.m.** on **05/27/2021**, to be thereafter on said date and at said location publicly opened and read aloud. The Bidder assumes sole responsibility for timely receipt of its Bid.

On and after 04/27/2021, and up to seventy-two hours (72) hours prior to the Bid Closing Deadline, copies of Bidding Documents will be available to Bidders for pick-up by Bidder at, or for mailing to Bidder upon written request by Bidder submitted to, Mission Reprographics, 2050 East La Cadena Dr. Suite L, Riverside, CA 92507. At the time of such pick-up or request for mailing, a non-refundable fee of One Hundred Ten dollars (\$110) for each hard copy set or Thirty-Five dollars (\$35) for a digital download. Bidding Documents shall be paid by Bidder by cash or by check or money order made payable to Mission Reprographics. The Bidding Documents may also be viewed in person between the hours of 8:00 a.m. and 5:00 p.m. Monday through Friday (except Holidays) at Riverside County Department of Facilities Management, 3133 Mission Inn Avenue, Riverside, CA 92507 and (951) 955-3345.

Pursuant to Labor Code section 1771.1, any contractor bidding, or subcontractor to be listed on a bid proposal subject to Public Contract Code section 4104, shall not be qualified to bid after March 1, 2015, unless currently registered and qualified to perform public works pursuant to Labor Code section 1725.5. No Contractor or subcontractor may enter into a contract (after April 1, 2015) without proof of current registration to perform public works.

**Bids will only be accepted from bidders who have previously pre-qualified with the County of Riverside, established and approved by the Board of Supervisors on 6/04/19, item number 3-7, General County Facilities Level I.**

A non-mandatory Pre-Bid Conference will be conducted on **05/18/2021**, commencing promptly at **10:00 a.m.**, at 49937 Comanche Ct, Aguanga, CA 92536. **Attendance at the non-mandatory Pre-Bid Conference is not required as a condition of bidding.** Sign language services are available for the Pre-Bid Conference upon written request received by **Erik Sydow at 951-955-8274 or esydow@rivco.org** at least three (3) business days prior to the Pre-Bid Conference.

The Bidder receiving the Award by the County is required:

- (1) to furnish a Performance Bond and Payment Bond as provided in the Instructions to Bidders and other Bidding Documents;
- (2) both at the time Bidder submits its Bid and other Bid Submittals and at the time of Award, to: (a) hold a contracting license, active and in good standing, issued by the Contractors State License Board for the State of California for the following license classification(s): "B" General Contractor with the appropriate "C" Class specialty subcontractors license classification(s); and (b) hold, or designate a Subcontractor that holds, the certification(s) required by Applicable Laws to perform the following work: Mechanical C20, Building Plumbing C36, Electrical & Low-Voltage/Information Technology C10/C7, Fire Protection C16; and
- (3) to comply with the provisions of the California Labor Code, including, without limitation, Sections 1771.4, 1773.1, 1774, 1775 and 1776 of the California Labor Code and including,

without limitation, the obligations to pay the general prevailing rates of wages in the locality in which the Work is to be performed and comply with Section 1777.5 of the California Labor Code governing employment of apprentices. Copies of the prevailing rates of per diem wages are on file at California State Department of Industrial Relations, 464 West Fourth St., Suite 348, San Bernardino, CA 92401, and are available to any interested party on request.

THIS IS A PUBLIC WORKS PROJECT AND SUBJECT TO COMPLIANCE MONITORING AND ENFORCEMENT BY THE DEPARTMENT OF INDUSTRIAL RELATIONS. The awarded prime contractor shall post job site notices as prescribed by regulation starting January 1, 2015. Contractor or subcontractor shall furnish records specified in Labor Code section 1776 to the Labor Commissioner.

Substitution of securities for any moneys withheld by County shall be permitted as provided for by Section 22300 of the California Public Contract Code.

Capitalized terms used herein shall have the meanings assigned to them in the Bidding Documents. For information contact: Facilities Management, 3133 Mission Inn Avenue, Riverside, CA 92507.



# INSTRUCTIONS TO BIDDERS

## ARTICLE 1 GENERAL PROVISIONS

### 1.1 DEFINITIONS

Capitalized terms used on the Bidding Documents shall have the meanings assigned to them in the forms of Construction Contract and General Conditions that are included in the Bidding Documents. Capitalized terms not so defined shall have the meanings assigned to them in, or if none is assigned as reasonably interpreted according to the context of, the portion of the Bidding Documents where such terms are used.

### 1.2 SUMMARY OF PROJECT

**1.2.1 Project Description.** The Project to be constructed generally consists of the following: construct a new two bay fire engine facility capable of housing up to four fire engines, restrooms, a workshop, storage, laundry and locker room. The identifying name of the Project is RIVERSIDE COUNTY FIRE DEPARTMENT STATION # 77 - LAKE RIVERSIDE EXPANSION PROJECT.

**1.2.2 Contract Time.** Substantial Completion of the Work must be achieved within one hundred eighty days (180) Days from the Date of Commencement. Final Completion must be achieved within twenty days (20) Days after the occurrence of Substantial Completion.

**1.2.3 Liquidated Damages.** The Construction Contract includes provisions: (1) permitting the County to assess liquidated damages to the Contractor of \$3,500 per Day for each Day after the expiration of the Contract Time for Substantial Completion that the Work is not Substantially Completed by Contractor; and (2) for payment by County to Contractor of liquidated damages to Contractor of \$800 per Day for each Day of Compensable Delay for which Contractor is entitled to a Contract Adjustment of the Contract Time and Contract Price.

**1.2.4 County Furnished Materials.** County reserves the right to elect to furnish the following County Furnished Materials for incorporation by Contractor as part of the Work pursuant to an assignment of one or more County Materials Contract(s) in accordance with Section 2.5 of the General Conditions: three (3) Hose Racks - Portable (installed by Contractor), S.C.B.A. Fill Station (installed by Contractor), Air Compressor (installed by Contractor). Said County Materials Contract(s) are available for review by Bidders with advanced notice and request to Erik Sydow at [esydow@rivco.org](mailto:esydow@rivco.org). Bidder is solely responsible to familiarize itself prior to submission of its Bid with the terms and conditions of such County Materials Contract(s). County shall notify the successful Bidder prior to Award if the County elects to assign any of such County Materials Contracts to Contractor for incorporation Contractor of the County Furnished Materials as part of the Work.

**1.2.5 Licensing.** The Bidder to whom the Construction Contract for the Work is Awarded by the County is required, both at the time of the Bid Closing Deadline and at the time of Award, to: (1) hold a contracting license, active and in good standing, issued by the Contractors State License Board for the State of California for the following license classification(s): B) General Building Contractor; and (2) hold, or designate in the Designation of Subcontractors a Subcontractor that holds, the certification(s) required by Applicable Laws to perform the following work: Mechanical C20, Building Plumbing C36, Electrical & Low-Voltage/Information Technology C10/C7, Fire Protection C16.

**1.2.6 No Warranty by County.** Bidders are solely responsible to satisfy themselves as to the suitability of any estimates, projections, budgets, criteria, surveys, reports, test data, recommendations, opinions, and other information provided by County relating to the Site, Work or Project (including, without limitation, all information contained in any Reference Documents) and nothing stated in the Bidding Documents, Contract Documents or in any other information provided by the County shall be construed as implying the creation

or existence of any warranty, express or implied, on the part of the County with respect to the completeness, accuracy or sufficiency thereof.

## **ARTICLE 2 BIDDER'S REPRESENTATIONS**

### **2.1 THE BIDDER BY SUBMITTING ITS BID REPRESENTS THAT:**

**2.1.1 Bidding Documents.** The Bidder has, in its capacity as contractor and not a design professional, carefully and thoroughly examined, compared and understood the Bidding Documents (including, without limitation, the Drawings, Specifications and Reference Documents identified in the Bidding Documents), and acting in that capacity has satisfied itself that the Bidding Documents are free of any errors, conflicts, ambiguities, lack of coordination and violations of Applicable Laws that might affect the Bidder's ability to complete the Work for the amount of its Bid and within the time period(s) for construction required by the Bidding Documents.

**2.1.2 Site Information.** In order to fully acquaint itself with all conditions, restrictions, obstructions, difficulties and other matters which might affect the Bidder's ability to complete the Work for the amount of its Bid and within the time period(s) for construction required by the Bidding Documents, the Bidder has carefully and thoroughly inspected: (1) the Site and its surroundings; (2) all Existing Improvements on the Site and their existing uses by the County, its invitees and the public; (3) routes of ingress and egress to and from the Site; (4) local conditions in the vicinity of the Site (including, without limitation, sources and availability of labor, materials and equipment); (5) the status of construction, if any, that is in-progress at the Site; and (6) all reports, data, as-built drawings and other information (including, without limitation, the Reference Documents identified in the Bidding Documents) concerning visible and concealed conditions (including, without limitation, locations and capacities of utility sources and lines) above and below the surface of the ground and in Existing Improvements that have been made available by the County to Bidders or that are disclosed by public records of the County of Riverside or the City in which the Project is located, and has correlated its observations with the requirements of the Bidding Documents.

**2.1.3 Bid Compliance.** The Bid and other Bid Submittals are in compliance with the Bidding Documents.

**2.1.4 No Exceptions.** The Bid is based upon the materials, equipment, systems and other work required by the Bidding Documents, without any exception, exclusion or qualification.

**2.1.5 Legal Status.** If the Bidder is a corporation, or if one or more of the partners or joint venturers of the Bidder (where the Bidder is a partnership or joint venture) is a corporation, such corporation(s) is(are) duly incorporated, authorized to do business and in good standing under the laws of the State of California.

**2.1.6 Licensing.** Bidder currently holds and, if and when an Award is made to Bidder, Bidder will hold at the time of Award, a license, active and in good standing, issued by the Contractors State License Board for the State of California authorizing the Bidder to contract to perform work in the requisite license classification(s) stated in the Notice Inviting Bids and/or in these Instructions to Bidders.

**2.1.7 Due Authorization.** The person or persons signing the Bid and other Bid Submittals on behalf of the Bidder are authorized to do so on behalf of the Bidder.

**2.1.8 Balanced Bid.** Cost breakdowns of the Bid that are provided by the Bidder are balanced, reflecting in each line item category of Work a reasonable estimate of the Bidder's cost commitments to perform that category of Work and a proportionate share of overhead and profit.

**2.1.9 Labor Compliance.** The Bid includes sufficient funds to enable Bidder to comply with, and Bidder will comply with, all of the applicable provisions of the California Labor Code, including, without

limitation, payment of prevailing wages, maintenance and submission of weekly certified payrolls and hiring of apprentices.

## 2.2 MISREPRESENTATION BY BIDDER

The County may determine as unresponsive any Bid in which any statement or representation made or incorporated by reference in the Bid, including any Bid Submittal comprising the Bid, is false, incorrect or materially incomplete and misleading.

## ARTICLE 3 BIDDING DOCUMENTS

### 3.1 COPIES

**3.1.1 Availability.** Copies of Bidding Documents will be available, on and after 04/27/2021, and up to seventy-two hours (72) hours prior to the Bid Closing Deadline, for pick-up by Bidder at, or for mailing to Bidder upon written request by Bidder submitted to, Mission Reprographics, 2050 East La Cadena Dr. Suite L, Riverside, CA 92507. At the time of such pick-up or request for mailing, a non-refundable fee of One Hundred Ten dollars (\$110.) for each hard copy set or Thirty-Five dollars (\$35) for a digital download. Bidding Documents shall be paid by Bidder by cash or by check or money order made payable to Mission Reprographics. The Bidding Documents may also be viewed in person between the hours of 8:00 a.m. and 5:00 p.m. Monday through Friday (except Holidays) at Riverside County Department of Facilities Management, 3133 Mission Inn Avenue, Riverside, CA 92507 and (951) 955-3345. Bidders may retain their copies of Bidding Documents.

**3.1.2 Sub-Bidders.** Unless otherwise stated in the Notice Inviting Bids, the County assumes no obligation to distribute Bidding Documents directly to Sub-Bidders.

**3.1.3 Complete Sets.** The Bidder shall use complete sets of Bidding Documents in preparing its Bid. The County assumes no responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

**3.1.4 No License.** No license to Bidder is intended or conferred by the County's issuance to Bidders of copies of the Bidding Documents.

### 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

**3.2.1 Examination by Bidder.** The Bidder shall, with reasonable care and diligence in its capacity as a contractor and not a design professional, carefully and thoroughly examine the Bidding Documents and prior to the Bid Closing Deadline report to the County in writing by means of a request for clarification provided in accordance with Paragraph 3.2.3, below, any information contained in the Bidding Documents constituting an error, conflict, ambiguity, lack of coordination or violation of Applicable Laws that might affect the Bidder's ability to complete the Work for the amount of its Bid and within the time period(s) for construction required by the Bidding Documents. Failure by the Bidder to do so shall not relieve the Bidder from its representations set forth in these Instructions to Bidders nor serve as the basis for any claim by the Bidder that it was mistaken or misled in connection with the preparation of its Bid or its planning for construction of the Work.

A non-mandatory Pre-Bid Conference will be conducted on 05/18/2021, commencing promptly at 10:00 a.m., at 49937 Comanche Ct, Aguanga, CA 92536. **Attendance at the non-mandatory Pre-Bid Conference is not required as a condition of bidding.** Sign language services are available for the Pre-Bid Conference upon written request received by Erik Sydow at 951-955-8274 or esydow@rivco.org at least three (3) business days prior to the Pre-Bid Conference.

**3.2.2 Pre-Bid Conference.** A non-mandatory Pre-Bid Conference will be conducted on 05/18/2021, commencing promptly at 10:00 p.m., at 49937 Comanche Ct, Aguanga, CA 92536. Attendance at the non-mandatory Pre-Bid Conference is required as a condition of bidding. Sign language services are available for the Pre-Bid Conference upon written request received by Erik Sydow at 951-955-

8274 or [esydow@rivco.org](mailto:esydow@rivco.org) at least three (3) business days prior to the day of the Pre-Bid Conference. Regardless of whether the Pre-Bid Conference is described in the Bidding Documents as mandatory or optional, Bidder shall be deemed charged with knowledge of all facts, circumstances and other information that were apparent, available or provided to Bidders at the Pre-Bid Conference, including, without limitation, any and all of the physical conditions of the land and Existing Improvements at the Site that were visible or available for inspection or review by the Bidders attending the Pre-Bid Conference.

**3.2.3 Requests for Clarification.** If the Bidder requires clarification or interpretation of the Bidding Documents, it shall make a written request to County by a request for clarification. All requests for clarification of the Bidding Documents must be submitted, in writing, between the hours of 8:00 a.m. and 5:00 p.m. on any Day, Monday through Thursday (except Holidays) up to, including and no later than the seventy-two hours (72) Day prior to Bid Closing Deadline, by hand delivery, mail, fax or e-mail to the following: Riverside County Department of Facilities Management, Attention Erik Sydow at [esydow@rivco.org](mailto:esydow@rivco.org) or in writing at 3133 Mission Inn Avenue, Riverside, CA 92507. No response will be made to requests for clarification received after that time.

**3.2.4 Addenda.** Interpretations, corrections and changes of the Bidding Documents will be made by Addenda. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding and the Bidder shall not rely upon them.

**3.2.5 Communications.** The Bidder shall not, at any time during the bidding process following advertisement of the Notice Inviting Bids and prior to issuance of the Notice of Intent to Award, communicate with the County, Architect, County Consultants or any employee or representative of any of them, concerning the Project except by means of a written requests for clarification submitted by Bidder in accordance with Paragraph 3.2.3, above.

### 3.3 SUBSTITUTIONS

**3.3.1 Requests for Substitutions.** The Bidder shall make requests for Substitutions on the County's Request for Substitution form included in the Bidding Documents. Such requests shall comply with the requirements of the Bidding Documents, including without limitation, the Plans and Specifications. Without limitation to the other requirements of the Request for Substitution form, requests for Substitutions shall include: (1) a description of the material, equipment or other work that is to be replaced or eliminated by the Substitution; (2) a description of any other changes to the Work, Existing Improvements, the Site or the work of Separate Contractors that would be necessary if the proposed Substitution were incorporated as part of the Work; (3) a statement that the Bidder accepts responsibility for the inclusion in its Bid of all of the costs of implementing the Substitution, including, without limitation, the costs of any related changes to the Work, Existing Improvements, the Site or the work of Separate Contractors; (4) all drawings, performance and test data and other information necessary for an evaluation of the Substitution by the County, Architect and County Consultants; and (5) a statement that the Bidder understands and agrees that if the Substitution is not approved and the Bidder submits a Bid, Bidder will provide the Work as specified in the Bidding Documents without such Substitution. The burden of proof of the merit of a proposed Substitution is entirely upon the Bidder requesting the Substitution.

**3.3.2 Deadline for Submission.** Any completed Request for Substitution form that Bidders wishes to have considered by County must be submitted, between the hours of 8:00 a.m. and 4:00 p.m. on any Day, Monday through Thursday (except Holidays) up to, including and no later than the seventh (7th) Day prior to the Bid Closing Deadline, in writing, by hand delivery, mail, or fax to the following: Riverside County Department of Facilities Management, Attention Erik Sydow at [esydow@rivco.org](mailto:esydow@rivco.org) or in writing at 3133 Mission Inn Avenue, Riverside, CA 92507. No response will be made to any Requests for Substitution form received after that time.

**3.3.3 Review by County.** To the maximum extent permitted by Applicable Laws, approval or disapproval of a Substitution proposed by a Bidder is in the sole and absolute discretion of the County. The County's decision to approve or disapprove of a proposed Substitution shall be final and binding. An Addendum shall be issued to all Bidders describing any Substitution properly and timely requested prior to

the Bid Closing Deadline that is approved by the County. Failure by County to respond to a properly and timely submitted Request for Substitution prior to 10:00 a.m. of the second (2nd) working day before the Bid Closing Deadline shall be automatically deemed to be a disapproval by County thereof.

**3.3.4 Standards.** In evaluating a Request for Substitution form submitted by a Bidder, the materials, products and equipment described in the Bidding Documents are generally viewed by the County as establishing the standards for function, dimension, appearance and quality to be met by the requested Substitution.

**3.3.5 Performance by Bidder.** In the event the Bidder has submitted a Request for Substitution form and the request for Substitution is denied, or deemed denied, by the County and the Bidder thereafter submits a Bid and receives the Award, then the Bidder shall execute the Construction Contract and provide the Work as specified, without such Substitution and at no additional cost or expense to the County.

**3.3.6 No Postponement.** Delays associated with the review, processing or approval of a Request for Substitution form submitted by Bidder shall not entitle Bidder to a postponement of the deadlines set forth in the Bidding Documents.

**3.3.7 No Bid Adjustment.** Neither approval nor disapproval of a Request for Substitution form shall be grounds for adjustment of a Bid.

#### **3.4 ADDENDA**

**3.4.1 Transmittal.** Addenda will be transmitted by County to all prospective Bidders who (1) attended and signed in at the Pre-Bid Conference (if any) or (2) have submitted a written request to County for notice of Addenda at Mission Reprographics, 2050 East La Cadena Dr. Suite L, Riverside, CA 92507, including in such request the Bidder's name and address for mailing.

**3.4.2 Inspection.** Copies of Addenda will also be made available for in-person inspection wherever Bidding Documents are on file for that purpose.

**3.4.3 Issuance.** Without limitation to the County's right to withdraw its request for Bids, Addenda may be issued up to, but not later than, seventy-two (72) hours prior to the Bid Closing Deadline; provided, however, that an Addendum withdrawing the request for Bids or one which postpones the Bid Closing Deadline may be issued at any time prior to the Bid Closing Deadline.

**3.4.4 Receipt by Bidder.** Failure of the Bidder to receive any Addendum shall not relieve the Bidder from any of its obligations under its Bid Submittal. The costs of performance by Bidder of all items of Work and other obligations contained in all Addenda issued by County shall be deemed included in the amount of the Bidder's Bid. The Bidder shall identify and list in its Bid all Addenda received and included in its Bid. The Bidder's failure to so acknowledge the receipt of all Addenda in its Bid may be asserted by the County as a basis for determining its Bid non-responsive.

### **ARTICLE 4 BIDDING PROCEDURES**

#### **4.1 PREPARATION OF BIDS**

**4.1.1 Bid Form.** Bidder shall state its Bid price using the Bid Form included in the Bidding Documents. A Bid presented on other forms shall be disregarded.

**4.1.2 Blanks.** All blanks on the Bid Form shall be legibly executed in a nonerasable medium.

**4.1.3 Figures.** Sums shall be expressed in a Bid in both words and figures. In case of discrepancy, the amount written in words shall govern.

**4.1.4 Alterations.** Interlineations, alterations and erasures in a Bid must be initialed by each and all of the signer(s) of the Bid.

**4.1.5 Alternative Bids.** Alternative Bids will not be accepted unless specifically requested in the Bidding Documents.

**4.1.6 Multiple Bids.** Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the Bid Security, state in its Bid the Bidder's refusal to accept the Award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on or conditions to its Bid Form nor qualify its Bid in any other manner.

**4.1.7 Name of Bidder.** Each copy of the Bid shall state the legal name of the Bidder and its legal form of business (i.e., sole proprietor, partnership, joint venture or corporation). Bids shall be submitted in the name of Bidder that appears in the Bidder's license issued by the State of California Contractors State License Board for the license classification(s) that the Bidder is required to hold pursuant to the Notice Inviting Bids. Each Bid shall bear the longhand signature and printed name and title of the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

**4.1.8 Bid Submittals.** Each Bid shall include the following Bid Submittals executed in the manner required by the Bidding Documents:

- .1 Bid Form, in the form specified in the Bidding Documents;
  - .2 Bid Security, consisting of either (a) a Bid Bond, in the form specified in the Bidding Documents, or (b) such other form of Bid Security as is permitted by these Instructions to Bidders;
  - .3 Bid Security Receipt, in the form specified in the Bidding Documents;
  - .4 Designation of Subcontractors, in the form specified in the Bidding Documents;
- and
- .5 Non-Collusion Declaration, in the form specified in the Bidding Documents.
  - .6 Iran Contracting Act Certification

**4.1.9 Modifications by Bidder.** Changes or additions to the Bid Form, recapitulations of the Work bid upon, conditions or limitations on the Work to be done, alternative proposals or any other modification of the Bid Form not specifically called for by the Bidding Documents may result in the County's rejection of the Bid as being non-responsive. No oral, telephonic, electronic, facsimile or telegraphic modification of any Bid submitted will be considered.

**4.1.10 Designation of Subcontractors.** The Bidder shall submit, on the Designation of Subcontractors form specified in the Bidding Documents, a list of the proposed Subcontractors and the portion of Work to be done by each Subcontractor as required by the Subletting and Subcontracting Fair Practices Act (Public Contract Code Sections 4100 et seq). Unless the Notice Inviting Bids expressly states otherwise, any information requested in the Designation of Subcontractors other than a Subcontractor's name and location of business must be submitted as part of the Bid and may not be submitted after the Bid Closing Deadline. If additional sheets are needed to provide the information requested in the Designation of Subcontractors, they shall be included by Bidder as part of its Bid and shall accompany the Designation of Subcontractors. If bidding of Alternates is called for by the Bidding Documents and the Bidder intends to use different or additional Subcontractors or if acceptance of the Alternate by County would cause the value of the Work to be performed by a Subcontractor not identified in the Designation of Subcontractors accompanying the Base Bid to exceed the threshold dollar amount required by Applicable Law for listing of Subcontractors, then a separate Designation of Subcontractors form must be submitted for each such

Alternate. If the Bidding Documents require the performance of Work for which the Bidder or a Subcontractor must hold a certification required by Applicable Laws to perform the work, and if the Bidder intends to use a Subcontractor holding such certification to satisfy said requirement and to perform such Work, then Bidder shall, without limitation to any other information that may be required by Applicable Laws, include in the Designation of Subcontractors the name of such Subcontractor and a description of the Work requiring such certification that the Subcontractor will be performing.

**4.1.11 Builder's All Risk (Course of Construction) Insurance.** The Bid Form states whether the Bidder shall include Builder's All Risk (Course of Construction) Insurance for the Project. If the Bid Form states that such insurance shall be included by the Bidder in its Bid, then Contractor shall provide a policy of Builder's All Risk (Course of Construction) insurance coverage that conforms to the requirements set forth in Subparagraph 11.1.1.5 and the other applicable provisions of Article 11 of the General Conditions. NOTWITHSTANDING THE FOREGOING, COUNTY RETAINS THE RIGHT exercised at any time prior to award TO ELECT TO USE ITS OWN BUILDER'S ALL RISK (COURSE OF CONSTRUCTION) INSURANCE and in the event County so elects to deduct the price for such insurance that is stated in Contractor's Bid, or if not so stated the amount included by Contractor for such insurance in the preparation of the Contractor's Bid, from the Contract Price by means of a Contract Adjustment pursuant to Change Order or Unilateral Change Order. If the County so provides the All Risk (Course of Construction) insurance for the Project, then Contractor shall assume the cost of any and all applicable policy deductibles (currently, \$50,000 per occurrence) and shall insure its own machinery, equipment, tools, etc. from any loss of any nature whatsoever.

**4.1.12 Interested Bidder.** No person, partnership, joint venture, corporation or other association of persons or entities submitting a Bid shall be allowed to submit more than one Bid or be interested in a Bid submitted by any other Bidder. A person, partnership, joint venture, corporation or other association of persons or entities that, in the capacity as a Subcontractor to a Bidder, has quoted a bid price to a Bidder is not disqualified from submitting a proposal or quoting prices to other Bidders or making a Bid as a general contractor for the entirety of the Work. For the purpose of this Paragraph, "interested in" means having a managerial or financial interest in another Bidder.

**4.1.13 Prequalification.** If the County has stated in the Notice Inviting Bids that bidding is limited only to bidders that were prequalified pursuant to a Prequalification conducted by County, and if Bidder was previously prequalified pursuant to that process to submit a Bid for the Project, then in addition to the requirements of the Bidding Documents the Bidder must comply with any additional requirements for bidding that are set forth in the Prequalification Documents, including, without limitation, compliance by Bidder with any continuing responsibilities for disclosure of any changes in ownership, management or financial condition. If the Bidder has been prequalified to submit a Bid for the Project it shall, if requested by County, submit prior to or with its Bid any certification(s) that the County is authorized to request by the terms of the Prequalification Documents governing the Bidder's prequalification.

**4.1.14 Applicable Laws.** All Bids must be submitted, filed, made and executed in accordance with Applicable Laws relating to bids for contracts of the nature provided for by the Bidding Documents, whether such Applicable Laws are expressly referred to herein or not.

**4.1.15 Non-Transferable.** A Bid is non-transferable.

**4.1.16 Registration with Department of Industrial Relations.** Pursuant to Labor Code section 1771.1, any contractor bidding, or subcontractor to be listed on a bid proposal subject to Public Contract Code section 4104, shall not be qualified to bid after March 1, 2015, unless currently registered and qualified to perform public works pursuant to Labor Code section 1725.5. No contractor or subcontractor may enter into a contract after April 1, 2015, without proof of current registration to perform public works.

## 4.2 BID SECURITY

**4.2.1 Forms of Bid Security.** Each Bid shall be accompanied by a Bid Security in the form of (1) cash, (2) a certified or cashier's check made payable to the County or (3) a Bid Bond (using the form of

Bid Bond included in the Bidding Documents) issued by an Admitted Surety, in an amount equal to at least ten percent (10%) of the Bid Amount, as a guarantee that the Bidder, if awarded the Construction Contract, will enter into a Construction Contract with the County and furnish the Performance Bond, Payment Bond and other Post-Award Submittals required by the Bidding Documents. Should the Bidder refuse to enter into the Construction Contract or fail to furnish the Performance Bond, Payment Bond or any other Post-Award Submittal, then the Bid Security shall be forfeited to the County in an amount equal to the difference between the amount of Bidder's Bid Amount and the amount for which the County may procure the work from another Bidder plus the costs to the County of redrafting, redrawing and republishing the Bidding Documents.

**4.2.2 Retention by County.** The County will have the right to retain the Bid Security of any Bidder to whom an Award is being considered until either (1) the Construction Contract has been executed and the Performance Bond, Payment Bonds and other Post-Award Submittals have been furnished, or (2) all Bids have been rejected.

**4.2.3 Return by County.** Bid Security of an unsuccessful Bidder will be returned no later than sixty (60) Days after the Award by the County. Bid Security of the successful Bidder will be returned upon signing of a Construction Contract by the Bidder and County and submission by Bidder to the County of the Performance Bond, Payment Bond and other Post-Award Submittals in accordance with the requirements of the Bidding Documents.

#### **4.3 SUBMISSION OF BIDS**

**4.3.1 Sealed Envelope.** All copies of the Bidder's Bid, Bid Security and other Bid Submittals shall be enclosed by the Bidder in a sealed opaque envelope. Said envelope, as well as any other, outer envelope or packaging in which said envelope may have been placed by Bidder or the carrier for delivery, shall be addressed and delivered as provided in the Notice Inviting Bids and shall be clearly and conspicuously labeled with the Project name, the Bidder's name and address and the identifying name of the Project as set forth in Paragraph 1.2.1, above.

**4.3.2 Deposit.** Bids shall be hand delivered to, or received by mail at, the Clerk of the Board located on the 1st floor of the County Administrative Center, 4080 Lemon Street, Riverside, CA 92501, at any time Monday through Thursday (excepting Holidays) between the hours of 8:00 a.m. to 4:00 p.m. up to the Bid Closing Deadline of 1:00 p.m. on 05/27/2021. Bids must be received at the designated location prior to the Bid Closing Deadline. Bids, or any Bid Submittal comprising a Bid, that is received after the Bid Closing Deadline will be returned unopened.

**4.3.3 Postponement.** The County reserves the right to postpone the Bid Closing Deadline by issuance of an Addendum to the Bidding Documents at any time prior to the Bid Closing Deadline.

**4.3.4 Timely Receipt.** The Bidder assumes full and sole responsibility for timely receipt of its Bid, including its Bid Security and all other Bid Submittals, at the location designated in the Bidding Documents for receipt of Bid.

**4.3.5 Delivery Methods.** Deposit of Bids shall be by hand delivery or mail, only. Oral, telephonic, telegraphic, facsimile or other electronic transmission is not permitted.

#### **4.4 WITHDRAWAL OR RESUBMISSION OF BID**

**4.4.1 Before Bid Closing Deadline.** Prior to the Bid Closing Deadline, a Bid may be withdrawn by notice to the County at the place designated for receipt of Bids stated in the Notice Inviting Bids. Such notice shall be in writing and signed by the Bidder. Partial withdrawal of a Bid or any Bid Submittal is not permitted.

**4.4.2 After Bid Closing Deadline.** Except as otherwise permitted by these Instructions to Bidders, each Bid shall constitute an offer that shall remain open for a period of sixty (60) Days after the



Bid Closing Deadline and during that period of time shall not, without the written consent of the County, be modified, withdrawn or canceled by the Bidder.

**4.4.3 Resubmission.** Withdrawn Bids may be resubmitted up to the Bid Closing Deadline.

**4.4.4 Bid Security.** If a Bid is withdrawn and re-submitted, the amount of Bid Security shall be based on the Bid Amount based on the Bid as resubmitted.

**4.5 BID ALTERNATES**

**4.5.1 Alternates.** The Bidding Documents  do  do not include Alternates.

**4.5.2 Bid Form.** If Alternates are included in the Bidding Documents, then a Bid amount for each and every such Alternate shall be included in the spaces provided in the Bid Form for that purpose. If the Bidder determines that the Alternate does not affect the amount of its Base Bid, then the Bidder shall enter "No Change" in the Bid Form.

**4.5.3 Basis for Award.** Where the Bidding Documents include Alternates, the method checked in the box provided below will be used to determine the lowest Bid price (only wording following a checked box applies):

**Award Method #1:** The lowest Bid price shall be the lowest Base Bid price without consideration of the Bidder's prices on the Alternates.

**Award Method #2:** The lowest Bid price shall be the lowest total of the Base Bid price and the following Alternates that will be used for the purpose of determining the lowest Bid price:

1.	
2.	
3.	
4.	
5.	

**Award Method #3:** The lowest Bid price shall be the lowest total of the Base Bid price and the following Alternates taken in the order as shown below which, when the Bidder's amount for the Alternate is added to or deducted from such Base Bid price, are less than, or equal to, the funding amount publicly disclosed by the County before the first Bid is opened:

1.	
2.	
3.	
4.	
5.	

**Award Method #4:** The lowest Bid price shall be determined in a manner that will prevent any information that would identify any of the Bidders or any of their Subcontractors

from being revealed to the County before the ranking of Bidders from lowest to highest has been determined.

**4.5.4 Bid Escrow Provisions.** The following provisions apply only if Subparagraph 4.5.4.1, below, provides that a Bid Escrow will be used for the Project.

**.1 Bid Escrow.** A Bid Escrow  will  will not be used for the Project.

**.2 Escrow Bid Documents.** Escrow Bid Documents, as that term is defined in the General Conditions, shall: (1) be in English; (2) be legible; (3) be detailed and comprehensive, showing a complete breakdown of quantities, prices, productivity calculations, crew sizes, direct and repair labor, plant and equipment usage, general conditions (i.e., direct overhead) costs, indirect overhead and profit and contingencies, and all other numerical factors used to compute the Bid (provided, however, with respect to Bid items having an estimated cost under \$10,000, estimated unit costs are acceptable without detailed cost estimates provided that the indirect costs, contingencies and markups are shown and allocated); (4) if estimates are based, in whole or in part, on a Geological Baseline Report (GBR) or other report on surface or subsurface conditions at the Site, clearly reference any statements, data, opinions or recommendations used or relied upon from the GBR or such other report; and (5) if the Bidder's Bid is based on a price from a Sub-Bidder that exceeds five percent (5%) of the Bid Amount, provide documentation and electronic files from such Sub-Bidder relating to its bid submitted to Bidder that comply with all of the requirements herein for Escrow Bid Documents, in which case such documents and electronic files from such Sub-Bidder shall be considered and submitted by Bidder as part of the Escrow Bid Documents that are required to be submitted pursuant to this Paragraph 4.5.4.

**.3 Deposit with County.** Each of the Bidders submitting the apparent three (3) lowest Bid prices shall place its Escrow Bid Documents in a sealed container, marked on the outside with (1) the words "Escrow Bid Documents", (2) the name of the Project, (3) Bidder's name and (4) the date of submission. The sealed container with the Escrow Bid Documents shall be delivered by such Bidders to the County, at the place for submission of Bids, within twenty-four (24) hours after the Bid Closing Deadline.

**.4 Review by County.** County will review the Escrow Bid Documents of the apparent successful Bidder to ensure that the Escrow Bid Documents comply with the requirements of this Paragraph 4.5.4, and any other requirements of the Bidding Documents relating to use of a bid escrow. Such review shall not constitute approval or acceptance by County of the proposed means, methods, techniques or procedures of the Bidder, confirmation by County that the Escrow Bid Documents comply with the Bidding Documents, nor shall such review or alter any term or condition of the Contract Documents.

**.5 Noncompliance by Bidder.** Failure by Bidder to comply with any of the requirements of this Paragraph 4.5.4 or any other requirements of the Bidding Documents relating to use of a bid escrow shall be grounds for County to determine that the Bidder's Bid is non-responsive. Without limitation to the foregoing, County shall have the right, in the exercise of its sole and absolute discretion, if it finds that the Escrow Bid Documents submitted by a Bidder do not so comply to: (1) direct that the Bidder submit the required documentation and electronic files within twenty-four (24) hours of written request by County; and/or (2) discuss with the Bidder any questions that may exist concerning the Escrow Bid Documents in an effort to clarify and reconcile the information contained in the Escrow Bid Documents.

**.6 Escrow Procedure.** The Escrow Bid Documents of the successful Bidder receiving the Award shall be placed and held in storage at a safe and secure location, at the expense of County, for the duration of the performance of the Work and until the later of (1) ninety (90) Days after Final Completion is achieved or (2) final resolution by settlement or final judgment in legal proceedings of all disputes relating to the Construction Contract or Work (the "Escrow Bid Documents Storage Period"). Escrow Bid Documents of the unsuccessful Bidders will be returned to them within sixty (60) Days following Award. Upon expiration of the Escrow Bid Documents Storage Period, County shall destroy or return to Bidder, and shall not retain, copies of that Bidder's Escrow Bid Documents. County will take reasonable steps to protect and preserve the Escrow Bid Documents from damage; however, County shall not be liable

for damage or loss occasioned by circumstances beyond the reasonable control of County, such as, without limitation, fire or Acts of God.

**.7 Bidder's Warranty and Representation.** Submission by a Bidder of its Escrow Bid Documents shall constitute a warranty and representation by such Bidder that it has no other written documents or electronic files containing information used in computing its Bid that are within the definition of Escrow Bid Documents as defined in the Bidding Documents and that Bidder agrees, in the event it receives Award of the Construction Contract, that it shall have no right to submit or offer into evidence in any legal proceedings in support of any request for Contract Adjustment, Claim or other request for any legal remedy or relief, any documentation or electronic files constituting Escrow Bid Documents that were not included in the Escrow Bid Documents submitted by Bidder.

**.8 Not Contract Documents.** The contents of the Escrow Bid Documents shall not be considered part of the Contract Documents.

**.9 Property Rights, Confidentiality.** The Escrow Bid Documents are, and shall always remain, the property and confidential information of the Bidder, subject to rights of review by the County and Bidder and other Permitted Uses as further described below. To the maximum extent permitted by Applicable Laws, County shall safeguard the Escrow Bid Documents, and all information contained therein, against disclosure and in so doing shall not disclose the Escrow Bid Documents to anyone who is not an employee, attorney or consultant of the County having a reason and need to review the Escrow Bid Documents in connection with one or more of the Permitted Uses.

**.10 Permitted Uses.** The Escrow Bid Documents may be opened, examined and used at any time by County or Bidder (including, without limitation, admission into evidence in any legal proceedings) for the purposes of aiding in an evaluation by County or Bidder, or a resolution by negotiation, settlement or legal proceedings, of a dispute between County and Bidder involving: (1) the submission or content of the Escrow Bid Documents submitted by Bidder; (2) a request by Bidder for relief from its Bid or for relief from any other obligation of Bidder in connection with the bidding process; (3) questions or disputes over the Bidder's right to, or the terms of, a Contract Adjustment; or (4) a Claim or other demand by County or Bidder for a legal remedy or recovery of money ("Permitted Uses"). Escrow Bid Documents shall not be used for any other purpose.

**.11 Examination.** Examination of the Escrow Bid Documents shall be in the presence of a representative of both County and Contractor unless a party fails, after reasonable notice from the party seeking to examine the Escrow Bid Documents, to arrange for a representative to be present, in which case the examination may take place by the requesting party alone. Copies of any portion of the Escrow Bid Documents may be made by either County or Bidder at the time of examination.

## **ARTICLE 5 CONSIDERATION OF BIDS**

### **5.1 OPENING OF BIDS**

All Bids shall be publicly opened and read aloud at the location for receipt of Bids on the Day of the Bid Closing Deadline. Without limitation to the County's right to reject all Bids, if two or more responsive Bids from responsible Bidders are the same and lowest, then the successful Bidder may be chosen by the County.

### **5.2 REJECTION OF BIDS**

**5.2.1 Rejection of Bid.** Any Bid that is in any way incomplete or irregular is subject to rejection by County.

**5.2.2 Rejection of All Bids.** The County has the right to reject all Bids, with or without extending the opportunity to any Bidder to re-bid.

### **5.3 WAIVER OF IRREGULARITIES**

The County has the right to waive informalities and irregularities in a Bid received or in the bidding process.

### **5.4 AWARD**

**5.4.1 Basis of Award.** It is the intent of the County to Award the Construction Contract to the responsible Bidder submitting a Bid in accordance with the requirements of the Bidding Documents for the lowest Bid Amount.

**5.4.2 Notice of Award.** Within fourteen (14) Days following public opening and reading of Bids, the County will issue a Notice of Intent to Award identifying the name of the Bidder to whom the County intends to Award the Construction Contract. Such notice will be mailed to all Bidders submitting a Bid. The County may, in its sole and absolute discretion, elect to extend the time for its issuance of its Notice of Intent to Award.

**5.4.3 Bid Protests.** Any Bidder submitting a Bid to the County may file a protest of the County's proposed Award of the Construction Contract provided that each and all of the following are complied with:

.1 The bid protest is in writing.

.2 The bid protest is both: (1) filed with and received by the Clerk of the Board at the following address, 4080 Lemon St. 1st Floor Riverside, CA 92501, not more than five (5) Days following the date of issuance of the Notice of Intent to Award. Failure to timely file and serve the bid protest as aforesaid shall constitute grounds for the County's denial of the bid protest without consideration of the grounds stated therein.

.3 The written bid protest sets forth, in detail, all grounds for the bid protest, including without limitation all facts, supporting documentation, legal authorities and argument in support of the grounds for the bid protest. Any grounds not set forth in the bid protest shall be deemed waived. All factual contentions must be supported by competent, admissible and credible evidence. Any bid protest not conforming to the foregoing shall be rejected as invalid.

.4 Provided that a bid protest is filed in conformity with the foregoing, the Director of Facilities Management, such individual(s) as may be designated by the Director of Facilities Management in his/her discretion, shall review and evaluate the basis of the bid protest, and shall provide a written decision to the Bidder submitting the bid protest, either concurring with or denying the bid protest. The written decision of the Director of Facilities Management or his/her designee shall be final, unless overturned by the Board of Supervisors.

## **ARTICLE 6 POST- AWARD**

### **6.1 POST- AWARD SUBMITTALS**

**6.1.1 Construction Contract.** The Bidder identified in the Notice of Intent to Award as the successful Bidder to receive Award by the County shall execute the Construction Contract and return it to the County within amount of days (no. days) Days after issuance by County to Bidder of the Construction Contract from the County and prior to execution of the Construction Contract by County.

**6.1.2 Other Post-Award Submittals.** Within the time periods set forth below, the Bidder identified in the Notice of Intent to Award as the successful Bidder shall submit the following additional Post-Award Submittals, completed and signed in the manner required by the Bidding Documents, to the County at Riverside County Department of Facilities Management, Attention: Erik Sydow, 3133 Mission Inn Avenue, Riverside, CA 92507 and (951) 955-3345:

.1 within ten (10) Days after issuance by County to Bidder of the Notice of Intent to Award and prior to commencement of the Work, such Bidder shall submit to County the following:

- (1) Performance Bond and Payment Bond (issued by Surety);
- (2) Evidence of Insurance, in the form specified in the Bidding Documents;
- (3) Workers' Compensation Certificate, in the form specified in the Bidding Documents;
- (4) Declaration of Sufficiency of Funds (required only if the Bidder has not entered into a collective bargaining agreement covering the workers to be employed for performance of the Work), in the form specified in the Bidding Documents;

.2 within twenty-one (21) Days after issuance by County to Bidder of the Notice of Intent to Award, such Bidder shall submit to the County the following:

- (1) Construction Schedule, prepared by Bidder in the manner required by Section 3.9 of the General Conditions and Section 3.9 of the Specifications; and
- (2) Schedule of Values, prepared by Bidder in the manner required by Section 9.3 of the General Conditions and Section 9.3 of the Specifications.

**6.1.3 Failure to Submit.** Failure of the successful Bidder to submit any the Post-Award Submittals specified in Paragraphs 6.1.1 and 6.1.2, above, within the time periods specified therein shall be deemed to be a failure or refusal to execute the Construction Contract and shall be cause for forfeiture of such Bidder's Bid Security.

## **6.2 BIDDER RESPONSIBILITY**

County reserves the right to request that any Bidder submit, as a condition of Award, information demonstrating that the Bidder and/or any of the Subcontractors listed in the Designation of Subcontractors submitted by Bidder, is financially and in all other respects possessed of the attributes of trustworthiness, as well as quality, fitness, capacity and experience, to satisfactorily perform under the terms and conditions of the Bidding Documents, Contract Documents and its Bid. Bidder shall comply with such request by submitting the information requested within five (5) Days of receipt of County's request. Failure to do so may be treated by County as a grounds to reject Bidder's Bid. Failure by the County to make such a request shall not constitute a waiver of its right to determine that Bidder or any such Subcontractor is not responsible to perform the Work.

## **ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND**

### **7.1 BOND REQUIREMENTS**

**7.1.1 Performance and Payment Bonds.** The successful Bidder will be required to furnish: (1) a Performance Bond in the form included in the Bidding Documents guaranteeing faithful performance of all obligations under the Construction Contract; and (2) a Payment Bond that complies with the requirements of Civil Code Section 9554 in the form included in the Bidding Documents. The penal sums of the Performance Bond and Payment Bond shall each be initially in the amount of one hundred percent

(100%) of the Contract Price. The penal sum shall be increased for Contract Adjustments increasing the Contract Price that are authorized by Change Order or Unilateral Change Orders.

**7.1.2 Cost of Bonds.** The cost of Performance Bonds and Payment Bonds shall be deemed included in the amount of a Bidder's Bid.

**7.1.3 Surety.** Both the Performance Bond and Payment Bond shall be issued by an Admitted Surety. The Surety on the Performance Bond shall have an A.M. Best's Insurance Rating of A:VIII (A:8) or better.

## **7.2 TIME OF DELIVERY AND FORM OF BONDS**

**7.2.1 Submission by Bidder.** Within the time period set forth in Subparagraph 6.1.2.1, above, the successful Bidder shall deliver the required Performance Bond and Payment Bond to the County fully executed and issued by the Bidder's Surety(ies).

**7.2.2 Execution of Bonds.** Notary acknowledgements of the signatures of the Bidder and Surety(ies) is required. The attorney-in-fact who executes the required Performance Bond or Payment Bond on behalf of a Surety shall affix thereto a certified and current copy of the power of attorney authorizing such attorney-in-fact to execute same on behalf of such Surety.

## **ARTICLE 8 CONSTRUCTION CONTRACT**

### **8.1 EXECUTION OF CONTRACT**

The successful Bidder shall execute the Construction Contract in the form included in the Bidding Documents.

### **8.2 BOARD APPROVAL**

The Construction Contract shall not be binding upon the County until it has been awarded by the Director of Facilities Management or Board of Supervisors, and executed by the Board Chair, or designee.

## BID FORM

**TO THE GOVERNING BOARD OF THE COUNTY OF RIVERSIDE:**

Date: \_\_\_\_\_

Bidder: \_\_\_\_\_

The undersigned Bidder, having carefully examined the Bidding Documents for the following Project:

text

including, without limitation, the Plans and Specifications made part thereof, and taking into consideration all matters disclosed thereby, all matters of which Bidder is charged with knowledge by the terms thereof and all matters that are reasonably ascertainable by Bidder in the exercise of its duties of inquiry or investigation created by the terms set forth in the Bidding Documents (including, without limitation, the terms of Section 3.2 of the General Conditions, proposes, agrees to furnish in strict accordance with the Contract Documents all of the following:

- labor, materials, equipment, services, transportation;
- permits, licenses and taxes,
- **Builder's Risk (Course of Construction) Insurance coverage in accordance with the terms of Subparagraph 11.1.1.5 of the General Conditions;** and
- all other work, services and other things necessary for the undersigned to perform its obligations under the Contract Documents, excepting only those that are expressly stated in the Bidding Documents to be the responsibility of County,

for the total Base Bid price of (state in figures) \$ \_\_\_\_\_ (state in words) \_\_\_\_\_ dollars  
and \_\_\_\_\_ cents.

The foregoing Base Bid is submitted based upon and taking into consideration all of modifications and additions to the Bid Documents and other information set forth in each Addendum listed below, receipt and review of which is hereby acknowledged by Bidder (state below each and every Addendum number and date):

Addendum No.		Date:	
Addendum No.		Date:	
Addendum No.		Date:	
Addendum No.		Date:	
Addendum No.		Date:	
Addendum No.		Date:	
Addendum No.		Date:	

Subject to County's acceptance of such Alternate(s) in the manner set forth in the Instructions to Bidders, the foregoing Base Bid shall be adjusted as hereinafter stated for the following Alternates set forth in the Bidding Documents and/or the above-listed Addenda:

State Amount (in words and figures)	State if Amount is an "Add" or "Deduct" to Base Bid or, if Base Bid is Not Affected, Enter "No Change"
<b>Alternate 1:</b>	
Figures: \$ _____	<input type="checkbox"/> Add <input type="checkbox"/> Deduct <input type="checkbox"/> No Change
Words: _____	
_____ Dollars _____ Cents	
<b>Alternate 2:</b> insert description here	
Figures: \$ _____	<input type="checkbox"/> Add <input type="checkbox"/> Deduct <input type="checkbox"/> No Change
Words: _____	
_____ Dollars _____ Cents	
<b>Alternate 3:</b> insert description here	
Figures: \$ _____	<input type="checkbox"/> Add <input type="checkbox"/> Deduct <input type="checkbox"/> No Change
Words: _____	
_____ Dollars _____ Cents	
<b>Alternate 4:</b> insert description here	
Figures: \$ _____	<input type="checkbox"/> Add <input type="checkbox"/> Deduct <input type="checkbox"/> No Change
Words: _____	
_____ Dollars _____ Cents	
<b>Alternate 5:</b> insert description here	
Figures: \$ _____	<input type="checkbox"/> Add <input type="checkbox"/> Deduct <input type="checkbox"/> No Change
Words: _____	
_____ Dollars _____ Cents	



**THE UNDERSIGNED BIDDER HEREBY MAKES THE FOLLOWING REPRESENTATIONS AND COVENANTS:**

1. Except as otherwise permitted by the Instructions to Bidders, this Bid shall remain open for a period of sixty (60) Days after the Bid Closing Deadline (as defined in the Bidding Documents) and during that period of time shall not, without the written consent of County, be modified, withdrawn or canceled by the Bidder.

2. Bidder adopts and incorporates into this Bid all of the representations set forth in the Instructions to Bidders and hereby warrants that all such representations are true and correct.

3. The Bid Security submitted by Bidder is given as a guarantee that if Award of the Construction Contract that is the subject of this Bid is made to Bidder that Bidder will execute the Construction Contract and furnish the Performance Bond, Payment Bonds, evidence of insurance and other documents that Bidder is required to submit under the terms of the Bidding Documents, and in the event that the Bidder fails or refuses to execute and deliver same, such Bid Security shall be charged with the all losses and damages suffered by County as a result thereof and permitted by Applicable Law, including, without limitation, the difference between the amount of the Bid and amount for which the County may legally contract with another party to perform the Project (if such latter amount be greater than the Bid), costs of publication, and all other Losses suffered by County (including, without limitation, those associated with Delay to the Project).

4. Capitalized terms used in this Bid Form shall have the meanings assigned to them in the Bidding Documents.

**Individual Bidder**

Name of Bidder: \_\_\_\_\_

By: \_\_\_\_\_  
(Signature)

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Business Address:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Business Telephone: \_\_\_\_\_

Business Fax: \_\_\_\_\_

Business E-mail: \_\_\_\_\_

Contractor's License:  
Dept. of Industrial Relations  
Registration No: \_\_\_\_\_

**Corporation Bidder**

Corporate Name  
of Bidder: \_\_\_\_\_

State of Incorporation: \_\_\_\_\_

By: \_\_\_\_\_  
(Signature)

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Business Address:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Business Telephone: \_\_\_\_\_

Business Fax: \_\_\_\_\_

Business E-mail: \_\_\_\_\_

Contractor's License:  
Dept. of Industrial Relations  
Registration No: \_\_\_\_\_

Space for Corporate Seal and Attestation

**Partnership Bidder**

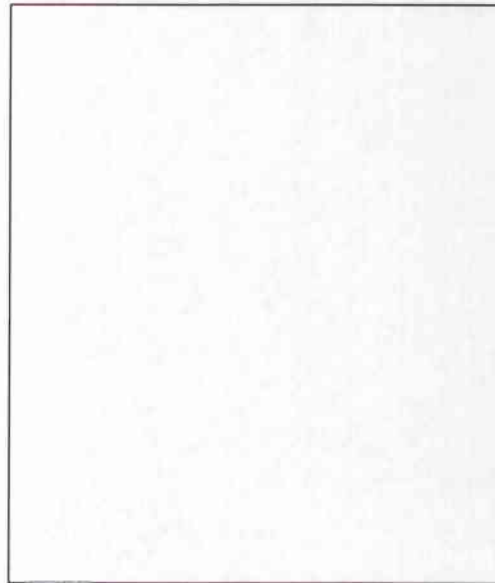
Name of Bidder: \_\_\_\_\_  
By: \_\_\_\_\_  
(Signature)  
Print Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Date: \_\_\_\_\_  
Business Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Business Telephone: \_\_\_\_\_  
Business Fax: \_\_\_\_\_  
Business E-mail: \_\_\_\_\_  
Contractor's License: \_\_\_\_\_  
Dept. of Industrial Relations  
Registration No: \_\_\_\_\_

If additional partners are signing, attach additional sheets setting forth the above signature information for each signing partner.

If the partner or partners signing on behalf of the Bidder is/are a corporation, then for each such corporate partner complete the following (attach additional sheets, if necessary):

Corporate Name  
of Partner: \_\_\_\_\_  
State of Incorporation: \_\_\_\_\_  
By: \_\_\_\_\_  
(Signature)  
Print Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Date: \_\_\_\_\_  
Business Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
Business Telephone: \_\_\_\_\_  
Business Fax: \_\_\_\_\_  
Business E-mail: \_\_\_\_\_  
Contractor's License: \_\_\_\_\_  
Dept. of Industrial Relations  
Registration No: \_\_\_\_\_

Space for Corporate Seal and Attestation



**Joint Venture Bidder**

Name of Bidder: \_\_\_\_\_

By: \_\_\_\_\_

(Signature)

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Business Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Business Telephone: \_\_\_\_\_

Business Fax: \_\_\_\_\_

Business E-mail: \_\_\_\_\_

Contractor's License: \_\_\_\_\_

Dept. of Industrial Relations

Registration No: \_\_\_\_\_

If additional joint venture partners are signing, attach additional sheets setting forth the above signature information for each signing joint venture partner.

If the joint venture partner or partners signing on behalf of the Bidder is/are a corporation, then for each such corporate joint venture partner complete the following (attach additional sheets, if necessary):

Corporate Name  
of Partner: \_\_\_\_\_

State of Incorporation: \_\_\_\_\_

By: \_\_\_\_\_

(Signature)

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

Business Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Business Telephone: \_\_\_\_\_

Business Fax: \_\_\_\_\_

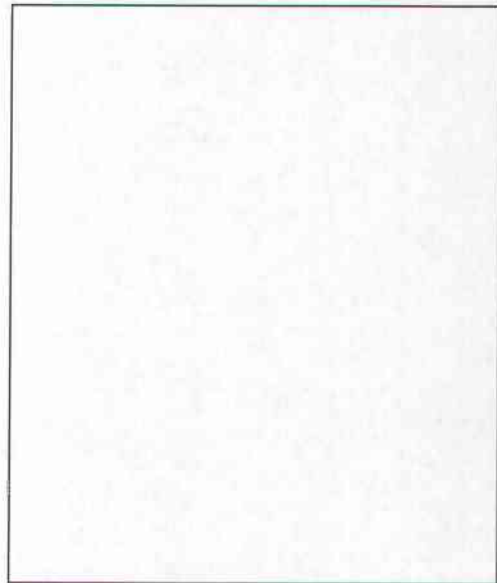
Business E-mail: \_\_\_\_\_

Contractor's License: \_\_\_\_\_

Dept. of Industrial Relations

Registration No: \_\_\_\_\_

Space for Corporate Seal and Attestation



Project No. FM08270007841

Bond No. \_\_\_\_\_

## **BID BOND**

(Public Work – Public Contract Code Section 20129 (a))

KNOW ALL MEN BY THESE PRESENTS THAT:

WHEREAS, The undersigned \_\_\_\_\_ (“Principal”) is herewith submitting to the County of Riverside (“County”) a Bid dated \_\_\_\_\_ 20\_\_, in the amount of (\$ \_\_\_\_\_) [Enter amount of Principal’s Bid Amount, as defined in the Instructions to Bidders] (“Bid Amount”) for the award by County to Principal of a contract (“Contract”) for the following: RIVERSIDE COUNTY FIRE DEPARTMENT STATION # 77 - LAKE RIVERSIDE EXPANSION PROJECT (“Project”);

AND, WHEREAS, Principal is obligated as a condition of said Bid to submit security pursuant to Public Contract Code Section 20129 (a) in the amount of ten percent (10%) of the Bid Amount, which security may be in the form of a Bid Bond issued by an admitted surety insurer pursuant to Code of Civil Procedure Section 995.120 (“Admitted Surety”);

NOW THEREFORE, the Principal and \_\_\_\_\_ (“Surety”), an Admitted Surety, are held and firmly bound unto the County in the penal sum of \_\_\_\_\_ (\$ \_\_\_\_\_) for the payment of which sum in lawful money of the United States, well and truly to be made, we, Principal and Surety, bind ourselves, our executors, administrators, successors, heirs and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if Principal is awarded the Contract upon such Bid and thereafter within the period of time specified in County’s bidding documents governing the bidding process applicable to such Bid (“Bidding Documents”) enters into the Contract with County on the terms and conditions required by the Bidding Documents and furnishes the performance and payment bonds, evidence of insurance and other documents that Principal is required to submit under the terms of the Bidding Documents, then this obligation shall be null and void; otherwise, it shall remain in full force and effect and the sum guaranteed by this bond shall, at the option of County, be forfeited to County to pay all losses and damages suffered by County as a result thereof and permitted by applicable law, including, without limitation, the difference between the Bid Amount and amount for which the County may legally contract with another party to perform the Work (if such latter amount be greater than the Bid Amount), costs of publication, and all other losses and damages suffered by County (including, without limitation, those associated with delay to the Project); provided, however, that Surety’s liability shall not exceed the penal amount of this bond.

Surety, for value received, hereby agrees that no change, extension of time, alteration or addition to the terms of the Contract or the Bidding Documents, or to the work to be performed thereunder, nor any withdrawal of the Bid in a manner not permitted by the requirements of the Bidding Documents shall in any way

impair or affect Surety's obligation under this bond, and Surety does hereby waive notice of any such changes, extensions of time, alterations or additions.

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

**Affix Seal if Corporation**

\_\_\_\_\_  
**(Firm Name – Principal)**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
**(Business Address)**

By \_\_\_\_\_  
**(Original Signature)**

\_\_\_\_\_  
**(Title)**

\_\_\_\_\_  
**(Corporation Name – Surety)**

**Affix Corporate Seal**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
**(Business Address)**

By \_\_\_\_\_  
**(Original Signature)**  
**ATTORNEY-IN-FACT**

\_\_\_\_\_

**Note:** Notary acknowledgment for Surety's signature and Surety's Power of Attorney must be included or attached

## BID SECURITY RECEIPT

The undersigned Bidder has submitted as Bid Security for its Bid in the form of (check appropriate box):

- Bid Bond executed by an Admitted Surety, made payable to the County of Riverside,
- cash,
- cashier's check payable to the order of the County of Riverside, or
- certified check payable to the order of the County of Riverside,

in the amount of \_\_\_\_\_  
dollars/\_\_\_\_\_ cents (\$\_\_\_\_\_), which amount is equal to ten percent (10%) of  
the Bidder's Bid Amount, as defined in the Instructions to Bidders.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Print Name of Bidder

\_\_\_\_\_  
Print Name of Signer

## DESIGNATION OF SUBCONTRACTORS

In compliance with the Subletting and Subcontracting Fair Practices Act (Chapter 4, commencing at Section 4100, Division 2, Part 1 of the Public Contract Code of the State of California) and any amendments thereto ("Act"), Bidder sets forth below the information required by the Act for those Subcontractors who are required to be listed by Bidder pursuant to the provisions of the Act [Insert information requested. Attach additional sheets, if needed.]:

<u>Portion of Work</u>	<u>Subcontractor Name</u>	<u>License No.</u>	<u>Location</u>

Date: \_\_\_\_\_

\_\_\_\_\_ (Name of Bidder)

By: \_\_\_\_\_  
(Signature of Bidder)

Address: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_



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

(Public Contract Code Section 7106)

The undersigned declares:

I am the \_\_\_\_\_ of \_\_\_\_\_, the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder.

All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price of any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on \_\_\_\_\_ [date], at \_\_\_\_\_ [city], \_\_\_\_\_ [state].

\_\_\_\_\_  
[Signature of Declarant]

\_\_\_\_\_  
[Printed Name of Person Signing]

\_\_\_\_\_  
[Name of Bidder]

\_\_\_\_\_  
[Office or Title]

## Iran Contracting Act

(Public Contract Code sections 2200-2208)

In accordance with Public Contract Code Section 2204(a), prior to bidding on, submitting a proposal or executing a contract or renewal for a County of Riverside contract for goods or services of \$1,000,000 or more, a Contractor must either:

- a) Certify it is not on the current list of persons engaged in investment activities in Iran created by the California Department of General Services ("DGS") pursuant to Public Contract Code section 2203(b) and is not a financial institution extending twenty million dollars (\$20,000,000) or more in credit to another person, for 45 days or more, if that other person will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS; or
- b) Demonstrate it has been exempted from the certification requirement for that solicitation or contract pursuant to Public Contract Code section 2203(c) or (d).

To comply with this requirement, please insert your Contractor or financial institution name and Federal ID Number (if available) and complete one of the options below. Please note: California law establishes penalties for providing false certifications, including civil penalties equal to the greater of \$250,000 or twice the amount of the contract for which the false certification was made; contract termination; and three-year ineligibility to bid on contracts. (Public Contract Code section 2205.)

**Option #1 – Certification**

I, the official named below, certify I am duly authorized to execute this certification on behalf of the Contractor/financial institution identified below, and the Contractor/financial institution identified below is **not** on the current list of persons engaged in investment activities in Iran created by DGS and is not a financial institution extending twenty million dollars (\$20,000,000) or more in credit to another person/vendor, for 45 days or more, if that other person/vendor will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS.

<i>Contractor Name/Financial Institution (Printed)</i>	<i>Federal ID Number (or n/a)</i>
<i>By (Authorized Signature)</i>	
<i>Printed Name and Title of Person Signing</i>	
<i>Date Executed</i>	<i>Executed in</i>

**Option #2 – Exemption**

Pursuant to Public Contract Code sections 2203(c) and (d), a public entity may permit a Contractor/financial institution engaged in investment activities in Iran, on a case-by-case basis, to be eligible for, or to bid on, submit a proposal for, or enters into or renews, a contract for goods and services.

If you have obtained an exemption from the certification requirement under the Iran Contracting Act, please fill out the information below, and attach documentation demonstrating the exemption approval.

<i>Contractor Name/Financial Institution (Printed)</i>		<i>Federal ID Number (or n/a)</i>
<i>By (Authorized Signature)</i>		
<i>Printed Name and Title of Person Signing</i>		
<i>Date Executed</i>	<i>Executed in</i>	

Project No. FM08270007841

Bond No. \_\_\_\_\_

## **PAYMENT BOND**

(Public Work - Civil Code Sections 9550 et seq.)

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WHEREAS, the County of Riverside ("County") by action of the Board of Supervisors on \_\_\_\_\_, 20\_\_, has awarded Construction Contract Number \_\_\_\_\_ ("Contract") to the undersigned \_\_\_\_\_ as Principal ("Principal") to perform the work ("Work") for the following project RIVERSIDE COUNTY FIRE DEPARTMENT STATION # 77 - LAKE RIVERSIDE EXPANSION PROJECT;

AND, WHEREAS, said Principal is required by the Contract and/or by Division 3, Part IV, Title XV, Chapter 7 (commencing at Section 9550) of the California Civil Code to furnish a payment bond in connection with the Contract;

NOW THEREFORE, we, the Principal and \_\_\_\_\_ ("Surety"), an admitted surety insurer pursuant to Code of Civil Procedure, Section 995.120, are held and firmly bound unto County in the penal sum of \_\_\_\_\_ Dollars (\$\_\_\_\_\_), this amount being not less than one hundred percent (100%) of the total sum payable by County under the Contract at the time the Contract is awarded by County to the Principal, lawful money of the United States of America, for the payment of which sum well and truly to be made, we, Principal and Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if Principal, its heirs, executors, administrators, successors, or assigns approved by County, or its subcontractors, of any contracting tier, shall fail to pay any person or persons named in California Civil Code, Section 9554, then Surety will pay for the same, in or to an amount not exceeding the penal amount hereinabove set forth.

Surety, for value received, agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the Work to be performed thereunder, nor any rescission or attempted rescission of the Contract or this bond, nor any conditions precedent or subsequent in the bond or Contract attempting to limit the right of recovery of any claimant otherwise entitled to recover under the Contract or this bond shall in any way impair or affect Surety's obligation under this bond, and Surety does hereby waive notice of any such changes, extensions of time, alterations or additions.

Surety is not released from liability to those for whose benefit this bond has been given, by reason of any breach of the Contract by County or Principal.

Surety's obligations hereunder are independent of the obligations of any other surety for the

performance of the Contract, and suit may be brought against Surety and such other sureties, joint and severally, or against any one or more of them or against less than all of them, without impairing County's rights against the others.

**Affix Seal if Corporation**

\_\_\_\_\_  
(Firm Name – Principal)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
(Business Address)

By \_\_\_\_\_  
(Original Signature)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Corporation Name – Surety)

**Affix Corporate Seal**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
(Business Address)

By \_\_\_\_\_  
(Signature – Attached Notary's Acknowledgment)

\_\_\_\_\_  
ATTORNEY-IN-FACT  
(Title-Attach Power of Attorney)

**Note:** Notary acknowledgment of signatures of Bidder and Surety, and Surety's Power of Attorney, must be included or attached

Project  
No. FM08270007841

Bond No. \_\_\_\_\_

## PERFORMANCE BOND

(Public Work – Public Contract Code Section 20129 (b))

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WHEREAS, the County of Riverside ("County") by action of the Board of Supervisors on \_\_\_\_\_, 20\_\_, has awarded Construction Contract Number \_\_\_\_\_ ("Contract") to the undersigned \_\_\_\_\_ as Principal ("Principal") to perform the work ("Work") for the following project: RIVERSIDE COUNTY FIRE DEPARTMENT STATION # 77 - LAKE RIVERSIDE EXPANSION PROJECT, which Contract is by this reference hereby incorporated herein and made a part hereof;

AND, WHEREAS, said Principal is required by the Contract and/or by California Public Contract Code, Section 20129 (b) to furnish a performance bond for the faithful performance of the Contract;

NOW THEREFORE, we, the Principal and \_\_\_\_\_ ("Surety"), an admitted surety insurer pursuant to Code of Civil Procedure, Section 995.120, are held and firmly bound unto County in the penal sum of \_\_\_\_\_ Dollars (\$\_\_\_\_\_), this amount being not less than one hundred percent (100%) of the total sum payable by County under the Contract at the time the Contract is awarded by County to the Principal, lawful money of the United States of America, for the payment of which sum well and truly to be made, we, Principal and Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if Principal, its heirs, executors, administrators, successors or assigns approved by County, shall in all things stand to and abide by and well and truly keep and perform all the undertakings, terms, covenants, conditions and agreements in the Contract, including, without limitation, all obligations during the original term and any extensions thereof as may be granted by County, with or without notice to Surety thereof (including, without limitation, the obligation for Principal to pay liquidated damages), all obligations during the period of any warranties and guarantees required under the Contract and all other obligations otherwise arising under the terms of the Contract (such as, but not limited to, obligations of indemnification), all within the time and in the manner therein designated in all respects according to their true intent and meaning, then this obligation shall become null and void; otherwise, it shall be and remain in full force and effect.

Whenever Principal shall be, and is declared by County to be, in default under the Contract, the Surety shall promptly either remedy the default, or, if the Contract is terminated by County or the Principal's performance of the Work is discontinued, Surety shall promptly complete the Contract through its agents

or independent contractors, subject to acceptance of such agents or independent contractors by County as hereinafter set forth, in accordance with its terms and conditions and to pay and perform all obligations of Principal under the Contract (including, without limitation, all obligations with respect to payment of liquidated damages) less the "Balance of the Contract Price" (as hereinafter defined); subject to the penal amount of this bond as set forth above. The term "Balance of the Contract Price," as used in this paragraph, shall mean the total amount payable to Principal by County under the Contract and any modifications thereto, less the amount previously paid by County to the Principal and less amounts that County is authorized to withhold under the terms of the Contract.

If County determines that completion of the Contract by Surety or its agents or independent contractors must be performed by a lowest responsible bidder selected pursuant to a competitive bidding process, then Surety shall comply with such processes in accordance with the requirements of County and applicable laws. Unless otherwise approved by District, in the exercise of its sole and absolute discretion, Surety shall not utilize Principal in completing performance of the Work.

No right of action shall accrue on this bond to or for the use of any person or entity other than County or its successors or assigns.

Correspondence or claims relating to this bond shall be sent to Surety at the address set forth below.

Surety, for value received, agrees that no change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder, shall in any way impair or affect Surety's obligation under this bond, and Surety does hereby waive notice of any such changes, extensions of time, alterations or additions.

Surety's obligations hereunder are independent of the obligations of any other surety for the performance of the Contract, and suit may be brought against Surety and such other sureties, joint and severally, or against any one or more of them or against less than all of them, without impairing County's rights against the others.

**Affix Seal if Corporation**

---

**(Firm Name – Principal)**

---

\_\_\_\_\_  
\_\_\_\_\_

(Business Address)

By \_\_\_\_\_  
(Original Signature)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Corporation Name – Surety)

Affix Corporate Seal

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
(Business Address)

By \_\_\_\_\_  
(Signature – Attached Notary's Acknowledgment)

\_\_\_\_\_  
ATTORNEY-IN-FACT  
(Title-Attach Power of Attorney)

**Note:** Notary acknowledgment of signatures of Bidder and Surety, and Surety's Power of Attorney, must be included or attached



**CONTRACTOR'S CERTIFICATE REGARDING WORKERS'  
COMPENSATION**

Labor Code Section 3700 states:

"Every employer except the state shall secure the payment of compensation in one or more of the following ways:

(a) By being insured against liability to pay compensation by one or more insurers duly authorized to write compensation insurance in this state.

(b) By securing from the Director of Industrial Relations a certificate of consent to self-insure either as an individual employer, or as one employer in a group of employers, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his or her employee.

(c) For any county, city, city and county, municipal corporation, public district, public agency, or any political subdivision of the state, including each member of a pooling arrangement under a joint exercise of powers agreement (but not the state itself), by securing from the Director of Industrial Relations a certificate of consent to self-insure against workers' compensation claims, which certificate may be given upon furnishing proof satisfactory to the director of ability to administer workers' compensation claims properly, and to pay workers' compensation claims that may become due to its employees. On or before March 31, 1979, a political subdivision of the state which, on December 31, 1978, was uninsured for its liability to pay compensation, shall file a properly completed and executed application for a certificate of consent to self-insure against workers' compensation claims. The certificate shall be issued and be subject to the provisions of Section 3702.

For purposes of this section, 'state' shall include the superior courts of California."

I am aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract.

\_\_\_\_\_  
(Name of Contractor)

\_\_\_\_\_  
By:

\_\_\_\_\_  
(Name of Signer)

\_\_\_\_\_  
(Signature)

(In accordance with Article 5 (commencing at Section 1860), Chapter 1, Part 7, Division 2 of the Labor Code, the above certificate must be signed and filed with the awarding body prior to performing any work under this contract.)

## DECLARATION OF SUFFICIENCY OF FUNDS

(California Labor Code Section 2810)

I, the undersigned, an authorized representative of \_\_\_\_\_ (“Bidder”) with authority to make the statements contained in this Declaration on behalf of Bidder, hereby declare the following:

1. The Bidder’s employer identification number for state tax purposes is \_\_\_\_\_.
2. The Bidder’s workers’ compensation insurance policy number is \_\_\_\_\_ and the name, address, and telephone number of the insurance carrier providing said insurance is: \_\_\_\_\_  
\_\_\_\_\_

3. The following information is provided concerning any and all vehicles that are owned by the Bidder and that will be used for transportation in connection with any service provided for the performance of the Work that is the subject of the Bidder’s Bid [Insert information requested. Attach additional sheets, if needed.]:

<b>Vehicle</b>	<b>Vehicle ID #</b>	<b>Vehicle. Liability Insurance Policy Number (of policy covering vehicle)</b>	<b>Name, Address and Telephone Number of Vehicle Liability Insurance Carrier (issuing policy covering vehicle)</b>

4. The following is the address of any real property that will be used to house workers in connection with the performance of the Work that is the subject of the Bidder’s Bid [If no such housing will be provided, enter “none”]: \_\_\_\_\_  
\_\_\_\_\_

5. The actual or estimated number of workers that will be employed to perform the Work that is the subject of the Bidder’s Bid, the total amount of wages to be paid to said workers, and the dates on which said wages will be paid are as follows [Attach additional sheets, if needed.]:

<b>Total Number of Workers</b>	<b>Total Amount of Wages</b>	<b>Date(s) for Payment of Wages</b>

6. Check only one of the following boxes, as applicable:

The statement of number of workers declared in Paragraph 5, above, is a statement of the actual number of workers that will be employed.

The actual number of workers requested in Paragraph 5, above, is unknown and therefore the statement of number of workers declared therein is based on the Bidder's best estimate available at the time of submitting its Bid, rather than the actual number of workers that will be employed and if and when the actual number of workers and the other information requested above is available, it will be reported to the County of Riverside by Bidder in writing.

7. The actual or estimated total number of persons who will be utilized as independent contractors to perform the Work of the Project that is the subject of the Bidder's Bid (together with their known, current local, state, and federal contractor license identification numbers that each is required to have under local, state or federal laws or regulations) are as follows [Attach additional sheets, if needed.]:

<b>List of Independent Contractors</b>	<b>Current, local, state and federal contractor license identification number</b>

8. Check only one of the following boxes, as applicable:

The statement of number of independent contractors declared in Paragraph 7, above, is a statement of the actual number of independent contractors that will be utilized.

The actual number of independent contractors requested in Paragraph 7, above, is unknown and therefore the statement of number of independent contractors declared therein is based on the Bidder's best estimate available at the time of submitting its Bid, rather than the actual number of independent contractors that will be utilized, and if and when the actual number of independent contractors

and the other information requested above is available, it will be reported to the County of Riverside by Bidder in writing.

I, the undersigned, declare under penalty of perjury that the foregoing statements are within my personal knowledge and are true and correct. Executed on this \_\_\_\_\_ day of \_\_\_\_\_, in the year 20\_\_ at \_\_\_\_\_, California.

\_\_\_\_\_  
(signature)

\_\_\_\_\_  
Type Name of Signer:

\_\_\_\_\_  
Type Name of Bidder:

## **SUBSTITUTION REQUEST FORM**

ONLY ONE (1) REQUEST FOR SUBSTITUTION FOR EACH PRODUCT WILL BE CONSIDERED.  
USE A SEPARATE SUBSTITUTION REQUEST FORM FOR EACH PROPOSED SUBSTITUTION.

**TO:** COUNTY OF RIVERSIDE  
**PROJECT:** RIVERSIDE COUNTY FIRE DEPARTMENT STATION # 77 - LAKE RIVERSIDE EXPANSION PROJECT  
**PROJECT NO.:** FM08270007841

Bidder requests Substitution of the following material, product, thing or service:

<b>Specification Section</b>	<b>Article No.</b>
<b>Specified Item</b>	<b>Address</b>
<b>Manufacturer's Name</b>	<b>Model or Catalog Number</b>
<b>Trade Name of Product</b>	<b>Specified Fabricators and Suppliers</b>

For each proposed Substitution, list below where in the Specifications the item to be replaced is currently specified, the item specified in the Specifications and that is proposed to be replaced by the Substitution and a brief description of the proposed Substitution:

Specification Reference	Specified Item	Proposed Substitution

**Respond to each of the following questions, attaching additional sheets if required:**

In the case of a manufactured material, product or thing, does the manufacturer certify that the proposed Substitution is appropriate for use as an "equal" to the material, product, or thing specified?

Yes       No

If so, attach such certification.

Are maintenance services available?

Yes  No

If so, describe scope and terms, including any limitations on maintenance services: \_\_\_\_\_

Are replacements materials, products or things, and all parts thereof, available?

Yes  No

Contractor agrees to provide specified item in the event this Substitution Request is denied?

Yes  No

Does the Substitution affect dimensions shown On Drawings?

Yes  No

If so, clearly describe changes: \_\_\_\_\_

Will you pay for changes to the building design, including architectural, engineering and detailing costs caused by the acceptance of the requested Substitution?

Yes  No

Would the Substitution, if used, affect any other trades?

Yes  No

If so, describe each affect: \_\_\_\_\_

Would the Substitution, if used, affect your ability to meet The time periods for construction required by the Bidding Documents?

Yes  No

If so, describe each affect: \_\_\_\_\_

Are there any differences between Substitution and specified item?

Yes  No

If so, describe each difference: \_\_\_\_\_

Are the manufacturer's guarantees and warranties of the Substitution and the specified item the same?

Yes  No

If so, describe each difference or attach copy of all written guarantees and warranties provided for the Substitution : \_\_\_\_\_

Attach complete product data, including but not limited to laboratory tests, approval numbers, research report numbers, listings, and approved assembly descriptions as specified in Section \_\_\_\_\_ of the Specifications or as required by Governmental Authorities under Applicable Laws.

\_\_\_\_\_  
**Contractor**

\_\_\_\_\_  
**County**

\_\_\_\_\_  
By

\_\_\_\_\_  
Reviewed by:

\_\_\_\_\_  
Date

\_\_\_\_\_  
Date

\_\_\_\_\_  
Remarks

\_\_\_\_\_  
**Design Consultant**

\_\_\_\_\_  
Reviewed by:

**SPACE RESERVED FOR COUNTY USE ONLY:**

Decision on Substitution Request:

**Grant**

**Deny**

**GENERAL CONDITIONS OF**  
**THE STANDARD FORM CONSTRUCTION CONTRACT**  
**BETWEEN COUNTY AND CONTRACTOR**

(LONG FORM)

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**GENERAL CONDITIONS OF**  
**THE STANDARD FORM CONSTRUCTION CONTRACT**  
**BETWEEN COUNTY AND CONTRACTOR**

(LONG FORM)

**ARTICLE 1**  
**GENERAL PROVISIONS**

**1.1 DEFINITIONS**

1.1.1 **Acceptance.** "Acceptance" means the point that the Project is formally accepted by the Board of Supervisors and a Notice of Completion is recorded by County.

1.1.2 **Act of God.** "Act of God" means earthquake, natural flood, tornado or other unusually severe natural or weather phenomenon occurring at the Site and causing Delay to performance of the Work at the Site; provided, however, that precipitation and winds shall not be an Act of God unless it exceeds in any given month the 10-year average of monthly levels as established by the National Oceanic and Atmospheric Administration ("NOAA") according to NOAA's records of measurable precipitation and winds taken at NOAA's recording station located within the Riverside County basin area that is nearest to the Site.

1.1.3 **Addendum.** "Addendum" means written or graphic information (including, without limitation, Drawings or Specifications) issued prior to the Bid Closing Deadline, which modifies or interprets the Bidding Documents by additions, deletions, clarifications or corrections.

1.1.4 **Admitted Surety.** "Admitted Surety" means a surety insurer that is duly certified pursuant to California Insurance Code §995.120 to transact business as a surety in the State of California.

1.1.5 **Allowable Costs.** "Allowable Costs" means those costs listed in Paragraph 7.7.3, below, that are used in calculating Contract Adjustments to the Contract Price.

1.1.6 **Allowable Markups.** "Allowable Markups" means those percentage markups listed in Paragraph 7.7.5, below, used in calculating Contract Adjustments to the Contract Price.

1.1.7 **Alternate.** "Alternate" means a proposed alternative described in the Bidding Documents adding to, or deleting from, the Bidding Documents a particular material, system, product or method of construction.

1.1.8 **Applicable Laws.** "Applicable Laws" means all statutes, ordinances, rules, regulations, policies and guidelines enacted by Governmental Authorities (including, without limitation, Environmental Laws and Disability Laws), codes adopted or promulgated by Governmental Authorities (including, without limitation, building and health and safety codes), lawful orders of Governmental Authorities and common law, including, but not limited to, principles of equity applied by the courts of the State of California, which are in effect at the time the Work is performed.

1.1.9 **Application for Payment.** "Application for Payment" means Contractor's itemized application for Progress Payment or Final Payment prepared, submitted and substantiated in accordance with the requirements of the Contract Documents.

1.1.10 **Architect.** "Architect" means the design professional retained by County that is primarily responsible for the preparation of the Drawings and Specifications for the Project.

1.1.11 **Award.** "Award" means either (1) a minute order duly adopted by the Board of Supervisors approving County's entering into the Construction Contract with Contractor or (2) execution of the Construction Contract by the Clerk of the Board.

1.1.12 **Base Bid.** "Base Bid" means the sum of money stated in a Bid for which the Bidder proposes to perform the Work, exclusive of adjustments for Alternates.

1.1.13 **Bid.** "Bid" means the completed and signed Bid Form and other Bid Submittals submitted by a Bidder to County in response to the Notice Inviting Bids and in accordance with the Instructions to Bidders.

1.1.14 **Bid Amount.** "Bid Amount" means the dollar amount that is used as the basis for determining which Bidder has submitted the lowest Bid price for purposes of Award pursuant to the County's chosen method of Award set forth in Paragraph 4.5.3 of the Instructions to Bidders.

1.1.15 **Bid Bond.** "Bid Bond" means alternative form of Bid Security submitted by a Bidder that consists of a surety bond issued by a Surety.

1.1.16 **Bid Closing Deadline.** "Bid Closing Deadline" means the deadline (date and time) for receipt of Bids by County that is stated in the Bidding Documents, as adjusted by Addendum.

1.1.17 **Bid Form.** "Bid Form" means the form prescribed by the Bidding Documents to be completed and signed by a Bidder showing the dollar amount(s) of its Bid.

1.1.18 **Bid Security.** "Bid Security" means a deposit of cash, certified or cashier's check or bond submitted by a Bidder in accordance with the Bidding Documents guaranteeing that if Award is made to the Bidder, the Bidder will enter into the Construction Contract and furnish the Performance Bond and Payment Bond and other Post-Award Submittals.

1.1.19 **Bid Submittal.** "Bid Submittal" means a document that Bidder is required by the Bidding Documents to submit with or as part of its Bid.

1.1.20 **Bidder.** "Bidder" means a person or entity submitting a Bid for Award of the Construction Contract.

1.1.21 **Bidding Documents.** "Bidding Documents" means the following collection of documents prepared and issued by County relating to the Project:

- .1 Notice Inviting Bids;
- .2 Instructions to Bidders;
- .3 Bid Form;
- .4 Standard Form of Construction Contract Between County and Contractor (unsigned);
- .5 General Conditions to Standard Form of Construction Contract Between County and Contractor (Long Form);
- .6 Specifications;
- .7 Plans and Drawings;
- .8 Addenda;
- .9 Reference Documents;
- .10 Safety Program; and
- .11 those documents, or those portions or provisions of documents, that, although not listed in Subparagraph 1.1.22.2 through Subparagraph 1.1.22.10, above, are expressly cross-referenced therein or attached thereto, including, without limitation, all documents submitted by Contractor as part of its Bid or Post-Award Submittals.



1.1.22 **Board of Supervisors.** "Board of Supervisors" means the Board of Supervisors for the County of Riverside.

1.1.23 **Change.** "Change" means a modification, change, addition, substitution or deletion in the Work or in Contractor's means, methods, manner, time or sequence of performing the Work arising from any cause or circumstances, including, without limitation, either directly at the request of County or constructively by reason of other circumstances. Use of the term "Change," in any context, in the Contract Documents shall not be interpreted as implying that Contractor is entitled to a Contract Adjustment on any basis other than as permitted by the terms of the Contract Documents for Compensable Change, Deleted Work or Compensable Delay.

1.1.24 **Change Order.** "Change Order" means a written instrument, signed in accordance with the requirements of the General Conditions, setting forth the agreement of County and Contractor on the terms of a Contract Adjustment.

1.1.25 **Change Order Request.** "Change Order Request" means Contractor's written request for a Contract Adjustment pursuant to Paragraph 7.6.2, below.

1.1.26 **Claim.** "Claim" means a written demand or assertion by Contractor seeking, as a matter of right, an interpretation of contract, payment of money, recovery of damages or other relief. A Claim does not include the following: (1) tort claims for personal injury or death; (2) stop payment notice claims; (3) a determination of the right of County to specific performance or injunctive relief to compel performance; (4) a determination of the right of County to suspend, revoke or limit the Contractor's Prequalification status or rating or to debar Contractor from bidding or contracting with County; or (5) a determination of the right of County under Applicable Laws to terminate the Construction Contract and/or recovery of penalties imposed upon Contractor for violation of statutory obligations under Public Contract Code §4100 *et seq.*

1.1.27 **Close-Out Documents.** "Close-Out Documents" means all Record Documents, warranties, guarantees, technical information, operations manuals, replacement parts, excess and attic stock and other documents (including, without limitation, electronic versions and hard copies) and things required to be submitted by Contractor under the Contract Documents as a condition of Final Completion or Final Payment.

1.1.28 **Compensable Change.** "Compensable Change" means circumstances involving the performance of Extra Work:

.1 that are the result of

(1) Differing Site Conditions,

(2) amendments or additions to Applicable Laws, which amendments or additions are enacted after the Bid Closing Deadline,

(3) a Change requested by County in accordance with the conditions of authorization applicable to Compensable Changes set forth in Article 7, below, or

(4) other circumstances involving a Change in the Work for which Contractor is given under the Contract Documents a specific and express right to a Contract Adjustment to the Contract Price;

.2 that are not caused, in whole or in part, by an act or omission of Contractor or a Subcontractor, of any Tier, constituting negligence, willful misconduct, or violation of an Applicable Law, or by a failure of Contractor of a Subcontractor, of any Tier, to comply with the Contract Documents;

.3 for which a Contract Adjustment is neither prohibited by nor waived under the terms of the Contract Documents; and

.4 that if performed would require Contractor to incur additional and unforeseeable Allowable Costs that would not have been required to be incurred in the absence of such circumstances.

1.1.29 **Compensable Delay.** "Compensable Delay" means a Delay to the critical path of activities affecting Contractor's ability to achieve Substantial Completion of the entirety of the Work within the Contract Time:

- .1 that is the result of
  - (a) a Compensable Change,
  - (b) the active negligence of County, Architect, a County Consultant or a Separate Contractor,
  - (c) a breach by County of an obligation under the Contract Documents, or
  - (d) other circumstances involving Delay for which Contractor is given under the Contract Documents a specific and express right to a Contract Adjustment adjusting the Contract Price;
- .2 that is not caused, in whole or in part, by an act or omission of Contractor or a Subcontractor, of any Tier, constituting negligence, willful misconduct, or a violation of an Applicable Law, or a failure by Contractor or any Subcontractor, of any Tier, to comply with the Contract Documents; and
- .3 for which a Contract Adjustment to the Contract Time is neither prohibited by nor waived under the terms of the Contract Documents.

1.1.30 **Construction Change Directive.** "Construction Change Directive" means a written instrument signed in accordance with the requirements of Article Z, below, that: (1) directs the performance of a Change that does not involve a Contract Adjustment; (2) establishes a mutually agreed basis for compensation to Contractor for a Compensable Change under circumstances where performance of the Compensable Change needs to proceed in advance of the County performing a full evaluation of the Contractor's rights relative to a Contract Adjustment; or (3) directs performance of Work or a Change with respect to which there exists a dispute or question regarding the terms of a Contract Adjustment.

1.1.31 **Construction Contract.** "Construction Contract" means the written form of Standard Form of Construction Contract Between County and Contractor included in the Bidding Documents signed by County and Contractor.

1.1.32 **Construction Schedule.** "Construction Schedule" means the detailed, critical path schedule prepared by Contractor in accordance with the requirements of the Contract Documents showing Contractor's plan for performance of the Work within the Contract Time.

1.1.33 **Contract Adjustment.** "Contract Adjustment" means an adjustment, additive or deductive, to the Contract Price or Contract Time that is permitted by the Contract Documents due to circumstances constituting a Compensable Change, Compensable Delay or Deleted Work.

1.1.34 **Contract Documents.** "Contract Documents" means the following collection of documents:

- .1 Construction Contract;
- .2 Addenda;
- .3 General Conditions;
- .4 Specifications;
- .5 Plans and Drawings;
- .6 Modifications;

- .7 Reference Documents;
- .8 Change Orders;
- .9 Unilateral Change Orders;
- .10 Construction Change Directives;
- .11 Safety Program;
- .12 other documents that comprise exhibits, attachments or riders to the documents listed in preceding Subparagraph 1.1.35.1 through Subparagraph 1.1.35.11, above;
- .13 executed Declaration of Sufficiency of Funds;
- .14 executed Non-Collusion Declaration; and
- .15 if the Bidding Documents limit bidding to Prequalified Bidders, those written representations, obligations or responsibilities made, acknowledged or assumed by the Bidder as part of the applicable Prequalification conducted by County, including, without limitation, any continuing obligations assumed by Contractor to disclose false or misleading information, report changes in ownership or management and comply with minimum safety requirements.

1.1.35 **Contract Price.** "Contract Price" means the dollar amount set forth in the Construction Contract as the total compensation payable by County to Contractor for complete performance by Contractor in accordance with the Contract Documents of the Work and other obligations assumed by Contractor under the Contract Documents.

1.1.36 **Contract Time.** "Contract Time" means the total number of Days set forth in the Construction Contract within which Contractor is obligated to achieve Substantial Completion and/or Final Completion of the Work, as extended or shortened by Contract Adjustments.

1.1.37 **Contractor.** "Contractor" means the person or entity identified by County as the Bidder receiving Award of the Construction Contract.

1.1.38 **Contractor Amount.** "Contractor Amount" means the component amount calculated on behalf of Contractor pursuant to Paragraph 15.1.5, below, that is used to determine the total net amount payable to Contractor or County in the event of a partial or full termination or discontinuance of the Work.

1.1.39 **Contractor's Own Expense.** "Contractor's Own Expense" means that Contractor agrees to assume sole responsibility to pay and be responsible for any resulting or associated Loss and Delay, without any Contract Adjustment and without any other form of compensation or reimbursement, of any kind, by County.

1.1.40 **County.** "County" means the County of Riverside, a political subdivision of the State of California.

1.1.41 **County Amount.** "County Amount" means the component amount calculated on behalf of County pursuant to Paragraph 15.1.5, below, that is used to determine the total net amount payable to Contractor or County in the event of a partial or full termination or discontinuance of the Work.

1.1.42 **County Consultant.** "County Consultant" means a consultant, other than Architect, engaged by County (or engaged as a subconsultant to the Architect or a County Consultant) to provide professional advice to County with respect to the design, construction or management of the Project.

1.1.43 **County Review Date.** "County Review Date" means an end date set forth in the Construction Schedule or Submittal Schedule within which County, Architect or a County Consultant is to provide information, review documents or render decisions, approvals or disapprovals.

1.1.44 **County Review Period.** "County Review Period" means a period of time set forth in the Construction Schedule or Submittal Schedule within which County, Architect or a County Consultant is to provide information, review documents or render decisions, approvals or disapprovals.

1.1.45 **County Risk Manager.** "County Risk Manager" means the individual employee of the County acting as its risk manager.

1.1.46 **County Website.** "County Website" means the website maintained by County at <http://www.rivcoeda.org>.

1.1.47 **Date of Commencement.** "Date of Commencement" means the starting date used for calculation of the Contract Time, and is the date, no earlier than the first working day following issuance of the Notice to Proceed, that is fixed in the Notice to Proceed issued by the County or, if no Notice to Proceed is issued, the Day that the Contractor actually commences Work at the Site in accordance with Paragraph 8.1.1, below.

1.1.48 **Day.** "Day", whether capitalized or not, and unless otherwise specifically provided, means calendar day, including weekends and Holidays.

1.1.49 **Declaration of Sufficiency of Funds.** "Declaration of Sufficiency of Funds" means the declaration, in the form included in the Bidding Documents, required to be submitted by Contractor under circumstances where Contractor has not executed a collective bargaining agreement covering the workers who will be employed to perform the Work.

1.1.50 **Defective Work.** "Defective Work" means materials, equipment, labor, workmanship, construction services or other construction work comprising the Work by Contractor or a Subcontractor that (1) is faulty, omitted, incomplete, or deficient, or (2) does not conform to Applicable Laws, the Contract Documents, or the requirements of any inspection, reference standard, test, code or approval specified in the Contract Documents.

1.1.51 **Delay.** "Delay" means any circumstances involving delay, disruption, hindrance or interference.

1.1.52 **Deleted Work.** "Deleted Work" means Work that is eliminated or its scope or cost reduced pursuant to a Change Order or Unilateral Change Order.

1.1.53 **Department of Industrial Relations.** "Department of Industrial Relations" means The Department of Industrial Relations of the State of California.

1.1.54 **Design Discrepancy.** "Design Discrepancy" means an error, omission, conflict, ambiguity, lack of coordination or noncompliance with Applicable Laws contained in the Bidding Documents, Contract Documents, Reference Documents or other information made available by County to Contractor prior to or after the Bid Closing Deadline.

1.1.55 **Design Documents.** "Design Documents" means all originals, copies and drafts of plans, drawings, tracings, specifications, programs, reports, calculations, presentation materials, models, building information models and other writings or materials containing designs, specifications or engineering information related to the Work or Project prepared by Architect, County Consultants, Contractor, Separate Contractors or Subcontractors including, without limitation, computer aided design materials, electronic data files and paper copies. The term "Design Documents" includes both the written documents and all building and other designs depicted therein.

1.1.56 **Design Intent.** "Design Intent" means the general intended design objectives of the Design Documents prepared by Architect and County Consultants, as described in Paragraph 1.2.1, below.

1.1.57 **Designation of Subcontractors.** "Designation of Subcontractors" means the list of proposed Subcontractors prepared by the Bidder pursuant to California Public Contract Code §§4100 et seq.

1.1.58 **Differing Site Condition.** "Differing Site Condition" means an unforeseen condition that constitutes a basis for Contract Adjustment pursuant to Paragraph 4.3.8, below.

1.1.59 **Director of Facilities Management.** "Director of Facilities Management" means the Director for Facilities Management, or his/her designee.

1.1.60 **Disability Laws.** "Disability Laws" means applicable federal, state, local or municipal laws, rules, orders, regulations, statutes, ordinances, codes, decrees, or requirements of any Government Authority, which regulate, relate to or impose liability or standards of conduct with respect to, or accessibility for, persons with disabilities, including, without limitation, the Americans with Disabilities Act (42 USCA §§ 12101 et seq.) and the Fair Housing Amendments Act of 1988 (42 USCA §§ 3604 et seq.).

1.1.61 **Discovery Date.** "Discovery Date", generally used in reference to Contractor's obligation to give written notice of certain facts, conditions or circumstances, means the earlier of the dates that Contractor or any Subcontractor either: (1) discovered such facts, conditions or circumstances; or (2) should have discovered such facts, conditions or circumstances in the exercise of the level of care required by the terms of the Standard of Performance.

1.1.62 **Drawings.** "Drawings" means graphic and pictorial documents showing the design, location and dimensions of the Project, and generally includes plans, elevations, subparagraphs, details, schedules and diagrams. The term "Drawings" is used interchangeably with "Plans".

1.1.63 **Environmental Laws.** "Environmental Laws" means all applicable federal, state, local or municipal laws, rules, orders, regulations, statutes, ordinances, codes, decrees and permits or other requirements of any Governmental Authority, which regulate, relate to, or impose liability or standards of conduct concerning any Hazardous Substance (including, without limitation, the use, handling, transportation, production, disposal, discharge or storage thereof), occupational or environmental conditions on, under, or about the Site or Existing Improvements (including, without limitation, soil, groundwater, and indoor and ambient air conditions), environmental protection (natural or manmade resources), or occupational health or industrial hygiene (but only to the extent related to Hazardous Substances on, under, or about the Site or Existing Improvements), as now or may at any later time be in effect, including without limitation, the Comprehensive Environmental Response, Compensation and Liability Act of 1980 [42 U.S.C.A. §§ 9601 et seq.]; the Resource Conservation and Recovery Act of 1976 [42 U.S.C.A. §§ 6901 et seq.]; the Clean Water Act (also known as the Federal Water Pollution Control Act) [33 U.S.C.A. §§ 1251 et seq.]; the Toxic Substances Control Act [15 U.S.C.A. §§ 2601 et seq.]; the Hazardous Substances Transportation Act [49 U.S.C.A. §§ 1801 et seq.]; the Insecticide, Fungicide, Rodenticide Act [7 U.S.C.A. §§ 136 et seq.]; the Superfund Amendments and Reauthorization Act [42 U.S.C.A. §§ 6901 et seq.]; the Clean Air Act [42 U.S.C.A. §§ 7401 et seq.]; the Safe Drinking Water Act [42 U.S.C.A. §§ 300f et seq.]; the Solid Waste Disposal Act [42 U.S.C.A. §§ 6901 et seq.]; the Surface Mining Control and Reclamation Act [30 U.S.C.A. §§ 1201 et seq.]; the Emergency Planning and Community Right to Know Act [42 U.S.C.A. §§ 11001 et seq.]; the Occupational Safety and Health Act [29 U.S.C.A. §§ 655 and 657]; the Residential Lead-Based Paint Exposure Act (Title X of the Housing and Community Development Act of 1992) [15 U.S.C.A. §§ 2681 et seq.]; the Lead-Based Paint Poisoning Prevention Act [42 U.S.C.A. §§ 4821 et seq.]; the Federal Endangered Species Act, the California Endangered Species Act, the Migratory Bird Treaty Act, the National Environmental Policy Act, the California Environmental Quality Act, Porter Cologne Water Quality Act (California Water Code §§ 13000 et seq), and all similar federal, state or local laws, rules, orders, regulations, statutes, ordinances, codes, decrees, or requirements.

1.1.64 **Escrow Agent.** "Escrow Agent" means an entity serving as escrow agent pursuant to California Public Contract Code §22300 in connection with the deposit of securities or retention.

1.1.65 **Escrow Bid Documents.** "Escrow Bid Documents" means all written documentation and electronic files reflecting the basis for and calculation of a Bid, including, without limitation, estimates, quantity take-offs, price quotations, product data, pricing data, memoranda, narratives, add/deduct sheets and reports (including, without limitation, reports on conditions at, under, or in the vicinity of the Site). The term "Escrow Bid Documents" does not include copies of Bidding Documents if they are not needed to comply with the requirements of the Bidding Documents applicable to submission of Escrow Bid Documents.

1.1.66 **Event of Contractor Default.** "Event of Contractor Default" means any of the events constituting default by Contractor as set forth in Paragraph 15.1.1, below.

1.1.67 **Evidence of Insurance.** "Evidence of Insurance" means the statement, completed by Bidder in the form included in the Bidding Documents, evidencing the Bidder's compliance with the insurance requirements of the Bidding Documents.

1.1.68 **Excusable Delay.** "Excusable Delay" means a Delay, other than a Compensable Delay, to Contractor's ability to achieve Substantial Completion or Final Completion of the Work within the Contract Time that is: (1) not caused, in whole or in part, by an act or omission of Contractor or a Subcontractor, of any Tier, constituting negligence, willful misconduct, a violation of an Applicable Law or a failure by Contractor or any Subcontractor, of any Tier, to comply with the Contract Documents; (2) unforeseeable, unavoidable and beyond the control of Contractor and the Subcontractors, of every Tier; and (3) the result of a Force Majeure Event. Without limitation to the foregoing, neither the bankruptcy, insolvency nor financial inability of Contractor or a Subcontractor, of any Tier, nor any failure by a Subcontractor, of any Tier, to perform any obligation imposed by contract or Applicable Laws shall constitute a ground for Excusable Delay.

1.1.69 **Existing Improvements.** "Existing Improvements" means all improvements located on the Site as of the Bid Closing Deadline, whether above or below the surface of the ground, including, but not limited to, existing buildings, utilities, infrastructure improvements and other facilities.

1.1.70 **Extra Work.** "Extra Work" means labor, materials, equipment, services or other work, not reasonably inferable by Contractor or its Subcontractors from the design and other information set forth in the Bidding Documents, the performance of which requires the expenditure by Contractor of additional and unforeseen Allowable Costs. References to Extra Work shall not be interpreted to mean or imply that Contractor is entitled to a Contract Adjustment unless such Extra Work constitutes a Compensable Change.

1.1.71 **Final Completion, Finally Complete.** "Final Completion" and "Finally Complete" mean the point at which the following conditions have occurred with respect to the entire Work:

- .1 the Work is fully completed, including all minor corrective, or "punch list," items;
- .2 all permits, approvals and certificates by Governmental Authorities, such as, but not necessarily limited to, a permanent or temporary certificate of occupancy required to occupy and use the Work have been issued free of any conditions that are the result of an act or omission of Contractor or a Subcontractor, of any Tier, constituting negligence, willful misconduct, a violation of an Applicable Law or a failure by Contractor or any Subcontractor, of any Tier, to comply with the Contract Documents;
- .3 the Work and the related portions of the Site have been thoroughly cleared of all construction debris and cleaned in accordance with the requirements of the Contract Documents, including, but not necessarily limited to where applicable, the following: removal of temporary protections; removal of marks, stains, fingerprints and other soil and dirt from painted, decorated and natural-finished woodwork and other Work; removal of spots, plaster, soil and paint from ceramic tile, marble and other finished materials; all surfaces, fixtures, cabinet work and equipment are wiped and washed clean and in an undamaged, new condition; all aluminum and other metal surfaces are cleaned in accordance with recommendations of the manufacturer; and all stone, tile and resilient floors are cleaned thoroughly in accordance with the manufacturer's recommendations and buff dried by machine to bring the surfaces to sheen;
- .4 all conditions set forth in the Contract Documents for Substantial Completion of the Work have been, and continue to be, fully satisfied;
- .5 all conditions pertaining to the Work and required for the release of County's obligations (including, but not limited to, release of County's bond obligations) to Governmental Authorities (including, but not limited to, matters involving grading, flood control, public works, transportation and traffic) have been satisfied; and
- .6 Contractor has delivered to County all Close-Out Documents.

1.1.72 **Final Completion Punch List.** "Final Completion Punch List" means the list of minor items of Work to be completed or corrected by Contractor for Final Completion.

1.1.73 **Final Payment.** "Final Payment" means payment by County to Contractor of the entire unpaid balance of the Contract Price due to Contractor following Final Completion.

1.1.74 **FM.** "FM" means Facilities Management for the County of Riverside.

**1.1.75 Force Majeure Event.** "Force Majeure Event" means, and is restricted to, any the following: (1) Acts of God occurring at the Site; (2) terrorism or other acts of a public enemy; (3) orders of Governmental Authorities (including, without limitation, unreasonable and unforeseeable Delay in the issuance of permits or approvals by Governmental Authorities that are required for the Work); (4) epidemics or quarantine restrictions; (5) strikes and other organized labor action occurring at the Site and the effects thereof on the Work to the extent such strikes and other organized labor action are beyond the control of Contractor and its Subcontractors, of every Tier, and to the extent the effects thereof cannot be avoided by use of replacement workers or implementation of a dual gate system of entry to the Site; or (6) unusual shortages in materials that are supported by documented proof that (a) Contractor made every effort to obtain such materials from all available sources, (b) such shortage is due to the fact that such materials are not physically available from single or multiple sources or could have been obtained only at exorbitant prices entirely inconsistent with current rates taking into account the quantities involved and the usual industry practices in obtaining such quantities, and (c) such shortages and the difficulties in obtaining alternate sources of materials could not have been known or anticipated as of the Bid Closing Deadline.

**1.1.76 Fragnet.** "Fragnet" means a contemporaneous, fragmentary scheduling network, which graphically identifies the sequencing of all critical and non-critical new activities and/or activity revisions affected by a Compensable Delay or Excusable Delay with logic ties to all affected existing activities noted on the Construction Schedule, that isolates and quantifies a time impact of a specific issue, determines and demonstrates any such specific Delay in relation to past and/or other current Delays and provides a method for incorporating all Contract Adjustments to the Contract Time into an update of the approved Construction Schedule.

**1.1.77 General Conditions.** "General Conditions" means the herein set forth general terms and conditions governing performance of the Work.

**1.1.78 General Requirements.** "General Requirements" means the portion of the Specifications so titled setting forth additional requirements for administration of the Work.

**1.1.79 Good Faith Determination.** "Good Faith Determination" means a determination made by the Director of Facilities Management or other authorized representative of County, which he/she believes in good faith to be a proper exercise of County's rights and to have a reasonable basis in fact, whether or not such determination is in fact proper, reasonable or correct or adjudged to be so.

**1.1.80 Governmental Authority.** "Governmental Authority" means the United States, the State of California, the County of Riverside (acting in its regulatory, rather than proprietary, capacity), the City in which the Project is located, any other local, regional, state or federal political subdivision, authority, agency, department, commission, board, bureau, court, judicial or quasi-judicial body, and any legislative or quasi-legislative body, or instrumentality of any of them, which exercises jurisdiction over the Project, Work, Site, Contractor or County, including, without limitation, any Governmental Authority having jurisdiction to review and approve or reject the Contract Documents or the Work based on compliance or non-compliance with Applicable Laws.

**1.1.81 Governmental Authority Review Period.** "Governmental Authority Review Period" means a period of time set forth in the Construction Schedule or Submittal Schedule for Governmental Authority review, and/or approval, of the Work.

**1.1.82 Guarantee To Repair Period.** "Guarantee To Repair Period" means the period of time set forth in Section 13.3, below, for repair or replacement of Defective Work.

**1.1.83 Hazardous Substance.** "Hazardous Substance" means either of the following: (1) any chemical, material or other substance defined as or included within the definition of "hazardous substances," "hazardous wastes," "extremely hazardous substances," "toxic substances," "toxic material," "restricted hazardous waste," "special waste," "contamination" or words of similar import under any Environmental Law, including, without limitation, the following: petroleum (including crude oil or any fraction thereof), asbestos, asbestos-containing materials, polychlorinated biphenyls ("PCBs") and PCB-containing materials, whether or not occurring naturally; or (2) any substance that because of its quantity, concentration or physical or chemical characteristics poses a significant present or potential hazard to human health and safety or to the environment, and which has been determined by any Governmental Authority to be a hazardous waste or hazardous substance.

1.1.84 **Holiday.** "Holiday" means a Day recognized by County as being a legal holiday for its staff and employees.

1.1.85 **Indemnitees.** "Indemnitees" means those persons or entities listed in Paragraph 3.18.1, below, as the "Indemnitees".

1.1.86 **Inspector of Record.** "Inspector of Record" means a person designated by the County to perform inspections on behalf of the County, who may be an employee or an independent consultant to County.

1.1.87 **Installation Subcontractor.** "Installation Subcontractor" means a Subcontractor who performs a portion of the Work that includes providing substantial, rather than minor and incidental, services for the installation of temporary or permanent materials, equipment or facilities at the Site.

1.1.88 **Instructions to Bidders.** "Instructions to Bidders" means the portion of the Bidding Documents setting forth the requirements to be followed by Bidders in preparing and submitting Bids.

1.1.89 **Intellectual Property Rights.** "Intellectual Property Rights" means all intellectual property rights, including, without limitation, patent, trademark, trade dress, copyright, industrial design rights, priority rights and trade secrets.

1.1.90 **Key Personnel, Key Persons.** "Key Personnel" and "Key Persons" mean those individuals employed by Contractor as described in Paragraph 3.8.1, below, and any replacements thereto approved by County, whose personal performance is deemed of the essence to the Construction Contract.

1.1.91 **Loss, Losses.** "Loss" and "Losses" mean any and all economic and non-economic losses, costs, liabilities, claims, damages, cost escalations, actions, judgments, settlements, expenses, fines, penalties and punitive damages including, without limitation, actual attorney's fees, expert and non-expert witness fees, arbitrator and arbitration fees, court costs (statutory and non-statutory), and mediation and mediator fees.

1.1.92 **Modification.** "Modification" means a document, other than a Change Order or Construction Change Directive, approved and signed by County and Contractor after execution of the Construction Contract, agreeing to alter, amend or modify the Contract Documents.

1.1.93 **Mold.** "Mold" means mold, mildew, spores or other microorganisms of any type, nature or description, or any by-product thereof, the presence of which poses an actual or potential threat to human health, including, without limitation, any species of organisms of the kingdoms of fungi or mycota, including yeasts, smuts, ruts, mildews, mold and mushrooms, or any microbial contamination, either airborne or surface, which arises out of or is related to the presence of fungi or spores (including, without limitation, aspergillus, cladosporium, penicillium and stachybotrys chartarum).

1.1.94 **Non-Collusion Declaration.** "Non-Collusion Declaration" means the form, so titled, required by California Public Contract Code §7106 and the Bidding Documents to be submitted by Bidder with its Bid.

1.1.95 **Notice Inviting Bids.** "Notice Inviting Bids" means the notice issued by or on behalf of County inviting submission of Bids for the Project.

1.1.96 **Notice Inviting Prequalification Statements.** "Notice Inviting Prequalification Statements" means the formal notice issued by County inviting contractors to participate in County's process for Prequalification of Bidders.

1.1.97 **Notice of Change.** "Notice of Change" means a formal written notice required to be submitted by Contractor pursuant to Paragraph 7.6.1, below, notifying County of circumstances that Contractor believes may give rise to a Contract Adjustment.

1.1.98 **Notice of Completion.** "Notice of Completion" means a "notice of completion" as defined in California Civil Code §9204.



1.1.99 **Notice of Delay.** "Notice of Delay" means a formal written notice prepared and submitted by Contractor pursuant to Paragraph 8.2.2, below, notifying County of circumstances that Contractor believes may give rise to a Contract Adjustment to the Contract Time for Excusable Delay or Compensable Delay or a Contract Adjustment to the Contract Price for Compensable Delay.

1.1.100 **Notice of Final Completion.** "Notice of Final Completion" means the written notice by County confirming the date of actual Final Completion.

1.1.101 **Notice of Intent to Award.** "Notice of Intent to Award" means the written notice by or on behalf of County stating County's intent to Award the Construction Contract.

1.1.102 **Notice of Substantial Completion.** "Notice of Substantial Completion" means the written notice by County confirming the date of actual Substantial Completion.

1.1.103 **Notice to Proceed.** "Notice to Proceed" means the written notice issued by County to Contractor to begin the Work.

1.1.104 **Payment Bond, Performance Bond.** "Payment Bond" and "Performance Bond" mean the surety bonds required to be provided by Contractor pursuant to Article 12, below.

1.1.105 **Plans.** "Plans" means the graphic and pictorial portions of the Contract Documents prepared by Architect or its Subconsultants showing the design, location and dimensions of the Work, including, without limitation, plans, elevations, details, schedules and diagrams. The term "Plans" is used interchangeably with "Drawings".

1.1.106 **Post-Award Submittals.** "Post-Award Submittals" means the documents described in the Bidding Documents that the apparent successful Bidder is required to submit after opening of Bids as a condition of Award.

1.1.107 **Pre-Bid Conference.** "Pre-Bid Conference" means the conference, specified in the Notice Inviting Bids as either mandatory or optional, held prior to the Bid Closing Deadline for the purpose of, without limitation, introducing the Bidders to the Project, and which conference may, or may not, include a review of the Site.

1.1.108 **Prequalification.** "Prequalification" means a process for Prequalification of contractors for bidding that is conducted by County pursuant to California Public Contract Code §20101 or as otherwise permitted by Applicable Laws.

1.1.109 **Prequalification Documents.** "Prequalification Documents" means the collection of documents issued to and submitted by individuals or entities pursuant to a Prequalification conducted by County.

1.1.110 **Prequalified Bidder.** "Prequalified Bidder" means a contractor that is prequalified as part of a Prequalification conducted by County pursuant to Public Contract Code §20101.

1.1.111 **Product Data.** "Product Data" means illustrations, standard schedules, charts, instructional brochures, diagrams and other information furnished by Contractor to illustrate a material, product or system for the Work.

1.1.112 **Progress Payment.** "Progress Payment" means a monthly payment of a portion of the Contract Price prior to Final Completion based on Contractor's progressed performance of the Work.

1.1.113 **Project.** "Project" means the improvements comprising, or necessary or appurtenant to the use of, the work of improvements described generally in the Bidding Documents, of which the Work may be the entirety of such improvements or only a part.

1.1.114 **Project Documents.** "Project Documents" means all writings (hard copy and electronic) in the possession of Contractor at the Site or elsewhere that relate in any way to the Project or Work.

1.1.115 **Project Team.** "Project Team" means County, Architect, County Consultants, Contractor, the Subcontractors, the Separate Contractors, Inspectors of Record and other firms or individuals retained by County, or

retained by others with County's approval, participating in the planning, programming, design, construction or inspection of the Work.

**1.1.116 Reasonable Order of Magnitude Estimate.** "Reasonable Order of Magnitude Estimate" means a general estimate prepared by Contractor, or jointly by Contractor and County, without the benefit of complete or definitive pricing by Subcontractors, of the projected additional cost and time associated with Contractor's performance of a particular item or items of Extra Work or Deleted Work described in a Construction Change Directive. Unless otherwise agreed to in writing between County and Contractor, a Reasonable Order of Magnitude Estimate does not constitute either an authorization or agreement by County to any Contract Adjustment or a guarantee or promise by Contractor with respect to the amount of any Contract Adjustment that may be associated with a Compensable Change or Deleted Work.

**1.1.117 Record Documents.** "Record Documents" means the collection of documents assembled and prepared by Contractor (including, without limitation, the Record Drawings and Specifications) showing the condition of the Work as actually built.

**1.1.118 Record Drawings, Record Specifications.** "Record Drawings" and "Record Specifications" mean the Drawings and Specifications marked by Contractor to show the condition, location and placement of the Work as actually built, including, without limitation, the locations of mechanical, electrical, plumbing or similar portions of the Work that are depicted diagrammatically in the Drawings.

**1.1.119 Reference Documents.** "Reference Documents" means reports, studies, surveys and other information provided by County for Contractor's review and consideration in preparing its Bid, including, without limitation, information describing the Site (including surface or subsurface conditions), Existing Improvements or Hazardous Substances at the Site.

**1.1.120 Request for Extension.** "Request for Extension" means a formal written request submitted by Contractor pursuant to Paragraph 8.2.3, below, setting forth the justification and support for Contractor's request for a Contract Adjustment to the Contract Time.

**1.1.121 Request for Information.** "Request for Information" means a written request by Contractor for clarification of what it perceives to be a discrepancy in the Contract Documents (including, without limitation, information in the Contract Documents constituting a Design Discrepancy or a variance between the information in the Bidding Documents or Contract Documents and conditions at the Site or in Existing Improvements).

**1.1.122 Safety Program.** "Safety Program" means the formal, written program prepared by Contractor setting forth detailed procedures and precautionary measures for protecting persons and property from injury or damage.

**1.1.123 Samples.** "Samples" means physical examples that, when approved by County and Architect, illustrate materials, equipment or workmanship by which the Work is to be evaluated and judged as part of the Submittal process.

**1.1.124 Schedule of Values.** "Schedule of Values" means a detailed, itemized breakdown of the Contract Price, which provides for an allocation of the dollar values to each of the various parts of the Work.

**1.1.125 Self-Performed Work.** "Self-Performed Work" means Work related to a Compensable Change or Deleted Work that is performed or to be performed by Contractor's own laborers who are employed by Contractor, rather than by the employees of a Subcontractor, using materials and equipment purchased by Contractor directly from a supplier or manufacturer.

**1.1.126 Separate Contractor.** "Separate Contractor" means a contractor, subcontractor, supplier or vendor under contract directly to County to provide services, materials, labor, equipment or other work to the Project.

**1.1.127 Shop Drawing.** "Shop Drawing" means a drawing, diagram, schedule and other data specially prepared for the Work by Contractor or a Subcontractor to illustrate some portion of the Work.

1.1.128 **Site.** "Site" means: (1) the parcel of land owned by County on which the Project is to be constructed and such additional parcels as may be purchased by County for such construction; (2) all areas adjacent to such parcels that may be used by Contractor or the Subcontractors for staging, storage, parking or temporary offices; and (3) all land areas, both private and public, adjacent to such parcels on which Work is required to be performed under the Contract Documents, Applicable Laws or permits relating to the Project.

1.1.129 **Specifications.** "Specifications" means the portion of the Contract Documents consisting of the written requirements for materials, equipment, standards and workmanship for the Work and performance of related services.

1.1.130 **Standard of Performance.** "Standard of Performance" means the general standard governing Contractor's performance of its obligations under the Construction Contract and General Conditions as set forth in Section 2.2 of the Construction Contract.

1.1.131 **State Water Resources Control Board.** "State Water Resources Control Board" means the State Water Resources Control Board of the State of California.

1.1.132 **Storm Water Permit.** "Storm Water Permit" means any applicable storm water, urban runoff or statewide general NPDES permit issued by the State of California or the United States pursuant to the provisions of the Clean Water Act (Title 33U.S.C.§§1251 et seq.) and/or Porter Cologne Water Quality Control Act (California Water Code §§13000 et seq.) and including any related regulations issued by the State of California or the United States.

1.1.133 **Sub-Bidder.** "Sub-Bidder" means a person or entity that submits a bid to a Bidder for some portion of the Work that is to be performed by that person or entity acting as a first-Tier Subcontractor.

1.1.134 **Subcontractor.** "Subcontractor" means a person or entity that has a contract to perform a portion of the Work, including without limitation, subcontractors, sub-subcontractors, suppliers, equipment operators, manufacturers and vendors, of any and every Tier.

1.1.135 **Submittal.** "Submittal" means a Shop Drawing, Product Data, Sample, detailed design, exemplar, fabrication and installation drawing, list, graph, operating instruction or other document required to be submitted by Contractor under the Contract Documents.

1.1.136 **Submittal Schedule.** "Submittal Schedule" means the schedule prepared by Contractor showing the timing for submission and review of Submittals during construction.

1.1.137 **Substantial Completion, Substantially Complete.** "Substantial Completion" and "Substantially Complete" mean the point at which the following conditions have occurred with respect to the entire Work or a portion of the Work designated by County in writing to be Substantially Completed prior to Substantial Completion of the entire Work:

.1 such Work is sufficiently and entirely complete in accordance with Contract Documents so that such Work can be fully enjoyed and beneficially occupied and utilized by County for its intended purpose (except for minor items which do not impair County's ability to so occupy and use such Work);

.2 all permits, approvals and certificates by Governmental Authorities, such as, but not necessarily limited to, a permanent or temporary certificate of occupancy required to occupy and use such Work have been issued free of any conditions that are the result of an act or omission of Contractor or a Subcontractor, of any Tier, constituting negligence, willful misconduct, a violation of an Applicable Law or a failure by Contractor or any Subcontractor, of any Tier, to comply with the Contract Documents; and

.3 all building systems included in such Work are operational as specified, all designated or required inspections and certifications by Governmental Authorities have been made and posted and instruction of County's personnel in the operation of the systems has been completed.

1.1.138 **Substantial Completion Punch List.** "Substantial Completion Punch List" means the list of items of Work to be completed or corrected by Contractor for Substantial Completion.

1.1.139 **Substitution.** "Substitution" means a material, product or item of material or equipment proposed by the Bidder or Contractor in place of that specified in the Bidding Documents or Contract Documents.

1.1.140 **Substitution Request Form.** "Substitution Request Form" means the form, so titled, that is included in the Bidding Documents for use by the Bidders when requesting a Substitution.

1.1.141 **Supplementary Conditions.** "Supplementary Conditions" means those portions of the Specifications that supplement, by addition, modification or deletion, a specific portion of the General Conditions.

1.1.142 **Surety.** "Surety" means Contractor's surety(ies) issuing the Bid Bond, Performance Bond or Payment Bond.

1.1.143 **Tier.** "Tier" means the contractual level of a Subcontractor with respect to Contractor. For example, a "first-tier" Subcontractor is under contract with Contractor. A sub-subcontractor under contract with a first-tier Subcontractor is in the "second tier," and so on. Use of the phrase "of every Tier", or similar phraseology, in the Contract Documents shall not be interpreted as implying that other provisions of the Contract Documents, where such phrase is not used, are intended to be limited in application to only the first Tier or to only certain other Tiers of Subcontractors.

1.1.144 **Time Impact Analysis.** "Time Impact Analysis" means a written report evaluating the impact of an Excusable or Compensable Delay, which shall include, at a minimum, the following: (1) a narrative description of the Delay and its impact on the critical path to achievement of a Substantial Completion or Final Completion of the Work or a portion of the Work designated by County within the Contract Time; (2) a Fragnet; (3) the number of Days of extension sought by Contractor as a Contract Adjustment to the Contract Time; (4) a computation of the Days of Compensable Delay multiplied times the liquidated damages payable to Contractor pursuant to Section 3.3 of the Construction Contract, if any, sought by Contractor; (5) a statement that Contractor has complied with the requirements of the General Conditions for written notice of Delays, along with the dates and copies of such notices; (6) the measures taken by Contractor and Subcontractors to prevent or minimize the Delay; and (7) Contractor's recommendations for reordering or re-sequencing the Work to avoid or minimize further Delay.

1.1.145 **Unexcused Delay.** "Unexcused Delay" means any Delay that is not a Compensable Delay or Excusable Delay or that constitutes a Compensable Delay or Excusable Delay for which Contractor is not entitled to a Contract Adjustment to the Contract Time, including, without limitation, the following: (1) Delay caused by an act or omission of Contractor or a Subcontractor, of any Tier, constituting negligence, willful misconduct, a violation of an Applicable Law or a failure by Contractor or any Subcontractor, of any Tier, to comply with the Contract Documents; (2) Delay for which Contractor has failed to provide a timely and complete Notice of Delay or Request for Extension; or (3) Delay associated with any circumstances where the costs or risk associated with such circumstances are designated in the Contract Documents as being at Contractor's risk or Contractor's Own Expense.

1.1.146 **Unilateral Change Order.** "Unilateral Change Order" means a writing signed by County in accordance with Article 7, below, in which County unilaterally sets forth its Good Faith Determination of the undisputed portion of an otherwise disputed Contract Adjustment.

1.1.147 **Work.** "Work" means all labor, materials, equipment, services, permits, licenses, taxes and other things necessary for Contractor to perform its obligations under the Contract Documents, including, without limitation, any Changes requested by County, in accordance with the Contract Documents and all Applicable Laws. The Work may constitute the whole or a part of the Project.

1.1.148 **Worker's Compensation Certificate.** "Worker's Compensation Certificate" means the statement, completed by Bidder in the form included in the Instruction to Bidders, evidencing the Bidder's compliance with the worker's compensation insurance requirements of the Bidding Documents and Applicable Laws.

## 1.2 CORRELATION, INTERPRETATION AND INTENT OF CONTRACT DOCUMENTS

1.2.1 **Design Intent.** The intent of the Contract Documents is for Contractor to provide all items necessary to produce a work of improvement that is complete as a whole and that is, in all of its parts, suitable for use and occupancy for its intended purpose, including, without limitation, all equipment, casework, mechanical, electrical and similar devices of whatever nature, completely installed, hooked-up and made fully operational and functional.

1.2.2 **Complementary.** Contract Documents are complementary, and what is called for by one shall be as binding as if called for by all. Any Work called for on the Drawings and not mentioned in the Specifications, or vice versa, shall be performed as though fully set forth in both.

1.2.3 **Technical Words.** Unless otherwise stated in the Contract Documents, technical words and abbreviations contained in the Contract Documents are used in accordance with commonly understood construction industry meanings and non-technical words and abbreviations are used in accordance with their commonly understood meanings.

1.2.4 **Trade Names.** It is not the intention of the Contract Documents to go into detailed descriptions of any materials or methods commonly known to the trade under a "trade name" or "trade term." The mere mention or notation of such "trade name" or "trade term" shall be considered a sufficient notice to the Contractor that it will be required to complete the Work so named with all its appurtenances according to first-class practices of the trade.

1.2.5 **Incidental Items.** The naming of any material or equipment shall mean furnishing and installing of same, including all incidental and accessory items thereto and labor therefor, in accordance with first-class practices of the trade involved, unless specifically noted otherwise.

1.2.6 **Drawing Dimensions.** Figured, derived or numerical dimensions on scale Drawings shall govern over Drawings without figured dimensions. The Drawings shall not be scaled to determine dimensions, and (except in the case of diagrammatic Drawings) dimensions shall be calculated from figures shown on the Drawings. Obvious discrepancies between scale and figured dimensions, not marked "not to scale," must be brought to the Architect's attention before proceeding with the Work affected by the discrepancy. Contractor shall carefully check and compare all portions of the Drawings and Specifications so as to correctly interpolate the intended dimensions for any portion of the Work that is not explicitly dimensioned in the Contract Documents.

1.2.7 **Drawings, Specifications.** In general, the Drawings will show dimensions, positions, and kind of construction and the Specifications will define materials, quality and standards. Work not particularly shown, detailed, marked or specified shall be the same as similar parts that are shown, detailed, marked or specified.

1.2.8 **Typical Work.** Work not particularly shown, detailed, marked or specified shall be the same as similar parts that are shown, detailed, marked or specified.

1.2.9 **Divisions of the Work.** All the Work mentioned or indicated in the Contract Documents shall be performed by Contractor as part of the Work unless specifically indicated in the Contract Documents to be done by others. The organization of the Specifications into divisions, sections and articles and the arrangement of the Drawings shall not control Contractor in dividing the Work among the Subcontractors or in establishing the extent of the Work to be performed by the Subcontractors.

1.2.10 **Applicable Laws.** Compliance with Applicable Laws shall be considered as a part of the Work.

1.2.11 **Interpretations of Laws.** In the event of a conflict between or among Applicable Laws governing performance of the Work, the more stringent shall govern. Contractor assumes, at Contractor's Own Expense, sole responsibility for, and the risk associated with, interpretations of Applicable Laws made by Contractor not predicated on written orders issued by Governmental Authorities that by their terms are applicable to the Project, including, without limitation, interpretations or assumptions made by Contractor based on decisions, orders or approvals (written or unwritten) issued by or on behalf of Governmental Authorities in connection with work on other projects or properties near or in the general vicinity of the Site.

1.2.12 **Modifiers.** The Contract Documents may omit modifying words such as "all" and "any," and articles such as "the" and "an." If a modifier or an article is not included in one statement and appears in another, it is not intended to affect the interpretation of either statement. The use of the word "including," when following any general statement, shall not be construed to limit such statement to specific items or matters set forth immediately following such word or to similar items or matters whether or not non-limiting language (such as "without limitation," "but not limited to," or words of similar import) is used with reference thereto, but rather shall be deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement.

**1.2.13 Singular, Gender, Captions.** When appropriate to the context, the use of the singular number shall be deemed to include the plural and vice versa. Each gender shall be deemed to include any other gender, and each shall include corporation, partnership, trust or other legal entity whenever the context so requires. The captions and headings of the various subdivisions of the Contract Documents are intended only as a matter of reference and convenience and in no way define, limit, or prescribe the scope or intent of the Contract Documents or any subdivision thereof.

**1.2.14 Cross-References.** Any cross-references indicated between various paragraphs or other portions of the Specifications, Drawings or other Contract Documents are provided for the convenience of Contractor and shall not be deemed to be all-inclusive.

**1.2.15 Diagrammatic Design.** Drawings and diagrams for mechanical, plumbing, electrical, fire sprinkler, fire alarm and low voltage Work shall be considered as diagrammatic only and shall not be used for any structural guidance or physical layout. Because such Drawings are diagrammatic, Contractor shall be responsible to provide any and all numbers and lengths of fittings, wire, conduit, connections, attachments or similar materials or devices needed to complete the Work, without Contract Adjustment, whether or not they exceed the numbers of pieces or the lengths indicated by such Drawings. Contractor is solely responsible to carefully plan and coordinate in advance, by means of coordination drawings prepared by Contractor or a Subcontractor, the installation of any Work shown diagrammatically and shall do so in such a manner as to make maximum use of the space available and anticipate and avoid wherever possible conflict and interferences among such portions of the Work and with other portions of the Work, including structural members.

**1.2.16 Demolition.** Existing Improvements at the Site of which no specific description is made in the Contract Documents, but which could be reasonably assumed to interfere with the satisfactory completion of the Work, shall be removed and disposed of by Contractor without Contract Adjustment. If Contractor is unsure whether a specific Existing Improvement at the Site which is not specifically described in the Contract Documents should be removed and disposed of, Contractor shall promptly ask the County whether such Existing Improvement is to be removed or remain in place, and shall comply with any directive given in response.

**1.2.17 Omissions.** Items missing from the Contract Documents shall nevertheless be provided by the Contractor, without Contract Adjustment, to the extent reasonably inferable from the Contract Documents as being necessary to satisfy the Design Intent.

**1.2.18 Conflicts.** Notwithstanding the provisions of Paragraph 1.2.19, below, in the event of conflict between any of the Contract Documents, the provision placing a more stringent requirement or greater burden on the Contractor or requiring the greater quantity or higher quality material or workmanship shall prevail, unless otherwise directed by the County in writing.

**1.2.19 Order of Precedence.** Conflicts that cannot be resolved in accordance with the rules of interpretation set forth elsewhere in this Section 1.2, shall be interpreted in accordance with the following order of precedence (the first being the highest order of precedence):

**.1** Applicable Laws (provided, however, and notwithstanding Subparagraph 1.2.19.10, below, where the Contract Documents or manufacturer's recommendations or specifications require standards higher than those of Applicable Laws, the Contract Documents or manufacturer's recommendations or specifications shall control);

**.2** Change Orders, Unilateral Change Orders and Construction Change Directives;

**.3** Addenda;

**.4** Construction Contract;

**.5** Supplementary Conditions;

**.6** General Conditions;

.7 General Requirements;

.8 Specifications;

.9 Drawings, subject to the following: (1) large scale plans and details take precedence over small scale Drawings in all cases; (2) full scale Drawings have precedence over both large and small scale Drawings in all cases; (3) detailed Plans and/or Drawings shall have precedence over general Plans and/or Drawings; (4) architectural and structural Drawings take precedence over electrical and mechanical Drawings in regard to location and arrangement of fixtures, outlets, and equipment; and (5) electrical and mechanical Drawings take precedence in describing and specifying equipment and in describing the diagrammatic requirements;

.10 standard and reference specifications which include industry norms, such as, but not limited to, ANSI and ASTM; and

.11 Reference Documents.

1.2.20 **Conditions Precedent.** Wording used in the Contract Documents indicating that a right of the Contractor or an obligation of the County is subject to or conditioned upon the occurrence of a condition or event, whether or not such condition or event is within the control of Contractor, County or others and whether or not such condition or event is expressly stated to be a "condition precedent", shall be understood and interpreted to mean that the stated condition or event is a condition precedent to the existence, arising, performance and exercise of such right or obligation.

### 1.3 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS

1.3.1 **Property of County.** Subject to the provisions of Paragraph 2.4.4, below, all Design Documents, Contract Documents and Project Documents that are prepared by Contractor or a Subcontractor, of any Tier, for use in connection with the Project, including any designs, building designs or other depictions underlying or shown in them, and the Intellectual Property Rights thereto, shall be deemed the sole and exclusive property of County and ownership thereof is irrevocably vested in County, whether the Project is executed or not.

1.3.2 **Assignment of Rights.** Contractor shall, without further consideration, obtain any and all Intellectual Property Rights in the Project Documents and Design Documents prepared by Contractor or any Subcontractor, of any Tier, for use in connection with the Project, including any designs, building designs or other depictions underlying or shown in them, free and clear of any liens or other encumbrances, claims or rights of third parties, transfer such rights, if necessary in writing, to County and cooperate with County in securing and registering such rights, such that County shall own all Intellectual Property Rights and any other tangible and/or intangible property rights associated therewith. Such transfer and assignment will be effective for the entire duration of the copyrights and include, but are not be limited to, all rights in related plans, specifications, documentation, derivative works and moral rights.

1.3.3 **Contractor's Warranty.** Contractor represents and warrants that the Project Documents and Design Documents prepared by Contractor or any Subcontractor for use on the Project, and the use of such Project Documents in the ordinary course, are free of any claim of infringement or any other violation of any Intellectual Property Right or other right of any third party.

1.3.4 **Non-Exclusive License.** Without derogation of County's rights under this Section 1.3, Contractor and Subcontractors, of every Tier, are granted a limited, non-exclusive license, revocable at will of County, to use and reproduce applicable portions of the Design Documents, Contract Documents and Project Documents as appropriate to and for use in the execution of the Work and for no other purpose.

1.3.5 **Reproduction.** Contractor shall do all reproduction and distribution of such reproducible prints of Contract Documents and Design Documents as are necessary for the complete pricing and performance of the Work, including, without limitation, all Changes. The costs of such reproduction shall be at Contractor's Own Expense.

1.3.6 **Delivery to County.** All Design Documents and Contract Documents (including originals and copies), and one (1) copy of all other Project Documents, in the possession of Contractor or Subcontractors shall be delivered to County upon the earlier of Final Completion of the Work or termination of the Construction Contract; provided, however, that Contractor shall have the right to retain one (1) copy of the Contract Documents and Submittals as a permanent record.

1.3.7 **Subcontractors.** Contractor shall take all necessary steps to ensure that a provision is included in all contracts with Subcontractors, of every Tier, who perform Work on the Project protecting and preserving County's rights as set forth in this Section 1.3.

## ARTICLE 2 COUNTY RIGHTS AND OBLIGATIONS

### 2.1 INFORMATION, APPROVALS AND SERVICES REQUIRED OF COUNTY

2.1.1 **Legal Descriptions.** County shall furnish, within a reasonable time after written request by Contractor, a legal description of the Site and information describing legal limitations affecting the Site that are recorded with applicable Governmental Authorities, such as, but not limited to, easements.

2.1.2 **Permits and Fees.** County shall secure and pay for only those permits and fees which are expressly stated to be the responsibility of County under the Contract Documents. County shall pay for all hook-up fees (not including "tap fees", which are the responsibility of Contractor pursuant to Paragraph 3.14.3, below) in order to establish a new account with a utility provider.

2.1.3 **County Approvals.** Information, approvals and decisions required of County or a County Consultant for which a County Review Period or County Review Date is included in the Construction Schedule that is approved by County shall be provided in accordance with the Construction Schedule. If a County Review Period or County Review Date is not set forth in the Construction Schedule approved by County, then such information, approvals and decisions shall be provided upon written request by Contractor without unreasonable Delay. Notwithstanding the foregoing, failure by County, Architect or a County Consultant to provide any information, approvals or decisions shall not be considered as a basis for Contract Adjustment to the Contract Time unless and until, and in calculating a Contract Adjustment any Delay or extension of the Contract Time resulting from a late-issuance of such information, approval or decision shall not commence until after:

.1 in the case of information, approval or decision for which there is a County-approved County Review Period or County Review Date in the County-approved Construction Schedule, seven (7) Days have passed since the County and the individual from whom such information, approval or decision is sought have received from Contractor a written notice containing all the following:

- (1) a detailed description of the information, approval or decision required;
- (2) a statement that the County Review Period or County Review Date has expired or passed; and
- (3) a statement, prominently displayed, that: "PURSUANT TO PARAGRAPH 2.1.3 OF THE GENERAL CONDITIONS, THE FAILURE TO PROVIDE THE REQUESTED INFORMATION, APPROVAL OR DECISION WITHIN 7 CALENDAR DAYS FROM THIS NOTICE MAY RESULT IN A REQUEST FOR A CONTRACT ADJUSTMENT"; or

.2 in the case of information, approval or decision for which there is no County Review Period or County Review Date set forth in the County-approved Construction Schedule, thirty (30) Days have passed since the County and the individual from whom such information, approval or decision is sought have received from Contractor a written notice that includes the statements set forth Clauses (1) and (2) of Subparagraph 2.1.3.1, above, and that includes a statement, prominently displayed, that: "PURSUANT TO PARAGRAPH 2.1.3 OF THE GENERAL CONDITIONS, THE FAILURE TO PROVIDE THE REQUESTED INFORMATION, APPROVAL OR DECISION WITHIN 30 CALENDAR DAYS FROM THIS NOTICE MAY RESULT IN A REQUEST FOR A CONTRACT ADJUSTMENT".



**2.1.4 Approvals.** Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of County, Architect or any other Project Team member, or by tests, inspections or approvals required or performed by persons other than the Contractor.

**2.1.5 Non-Specified Items.** County reserves the right to approve materials and sources of supply of materials that are not specified in the Contract Documents and that are used for the performance of the Work.

## **2.2 COUNTY'S RIGHT TO STOP THE WORK**

If Contractor fails to correct Defective Work as required by Section 13.2 of these General Conditions, fails to perform the Work in accordance with the Contract Documents or violates any Applicable Law, County may immediately order Contractor to stop the Work, or any portion thereof, until the cause for such direction has been eliminated by Contractor. Contractor shall immediately comply with such notice at Contractor's Own Expense. Nothing stated herein or elsewhere in the Contract Documents shall be interpreted as placing upon County a duty or responsibility to Contractor or any other party to exercise its right to stop the Work.

## **2.3 COUNTY'S RIGHT TO CARRY OUT THE WORK**

If Contractor fails to carry out the Work in accordance with the Contract Documents, fails to provide sufficient labor, materials, equipment, tools and services to maintain the Construction Schedule, or otherwise fails to comply with any requirement of the Contract Documents, and fails to cure such failure in the manner required by Subparagraph 15.1.1.4, below, County may correct such failure. In such case, County shall be entitled to recover from Contractor or deduct from payments then or thereafter due Contractor for any Loss resulting from such failure, including compensation for the additional services and expenses of County, County Consultants and others whose services are reasonably required and made necessary thereby. If payments then or thereafter due Contractor are not sufficient to cover such amounts, Contractor shall promptly pay the amount of the shortfall to County.

## **2.4 ACCOUNTING, RECORDS AND AUDIT**

**2.4.1 Accounting System.** Contractor shall exercise such controls as may be necessary for proper financial management of the Work. Such accounting and control systems shall comply with prevailing custom and practice for similar projects, be satisfactory to County and shall include preservation of the books and records described in Paragraph 2.4.2, below, subject to Contractor's obligations under Paragraph 1.3.6, above, for a period of ten (10) years after Final Completion of the Work, or for such longer period as may be required by Applicable Laws.

**2.4.2 Books and Records.** Contractor shall keep, and shall require provisions to be included in all contracts entered into by Subcontractors, of every Tier, requiring the Subcontractors, of every Tier, to keep, full and detailed books, records, information, materials and data, of every kind and character (hard copy, as well as computer readable data if it exists) that have any bearing on or pertain to any matters, rights, duties or obligations relating to the Project, Work or Construction Contract, including, without limitation, agreements, purchase orders, leases, contracts, commitments, arrangements, notes, change orders, change order requests, estimates, field orders, construction change directives, schedules, requests for information, diaries, logs, reports, shop drawings, samples, exemplars, drawings, specifications, invoices, delivery tickets, receipts, vouchers, cancelled checks, memoranda, accounting records; job cost reports, job cost files (including complete documentation of negotiated settlements), backcharges, general ledgers; documentation of cash and trade discounts earned, insurance rebates and dividends, and other documents relating in any way to any claims, charges or time extensions asserted by Contractor or any of the Subcontractors, of any Tier, or relating to any credits, rebates or discounts owing to County.

**2.4.3 Inspection and Copying.** Contractor shall allow, and shall require provisions to be included in all contracts entered into by Subcontractors, of every Tier, allowing, County and the auditor for the State of California (and the authorized representative(s), auditors, attorneys and accountants of each) upon twenty-four (24) hours notice to Contractor, full access to inspect and copy all its aforesaid books and records at a location within the Southern California area. Such right of audit may be exercised by either County or the auditor for the State of California as often as reasonably necessary to verify Contractor's continuing compliance with the Contract Documents.

**2.4.4 Confidential Information.** Nothing stated in this Section 2.4 or elsewhere in the Contract Documents shall be interpreted as a waiver by Contractor or any Subcontractor of any rights of privilege or confidentiality that are

provided for by Applicable Law nor as authorizing the inspection of books and records that contain information concerning estimating means or methods that is not, in whole or part, relevant to a charge or demand being asserted by Contractor or a Subcontractor involving Extra Work, Deleted Work, Delay or a Claim.

**2.4.5 Withholding of Payment.** In addition to and without limitation upon County's other rights and remedies for breach, including any rights of County to withhold payment that are set forth elsewhere in the Contract Documents, County shall have the right, exercised in its sole discretion, to withhold from any payment due to Contractor under an Application for Payment a sum of up to ten percent (10%) of the total amount set forth in such Application for Payment until Contractor and the Subcontractors have complied with any outstanding and unsatisfied obligation under this Section 2.4. Upon compliance with this Section 2.4, any such monies withheld shall be released to Contractor.

**2.4.6 Specific Performance.** Contractor agrees that any failure to provide access to books and records as required by this Section 2.4 will result in irreparable harm and prejudice to County and shall, without the necessity of posting of any bond or undertaking, be specifically enforceable by means of a mandatory injunctive order (temporary, preliminary, provisional or otherwise) issued by a court of competent jurisdiction, which order the County and Contractor hereby consent to being issued based upon affidavits and without the necessity of oral testimony.

## **2.5 COUNTY FURNISHED MATERIALS**

**2.5.1 Supply by County.** County shall have the right to furnish materials, products or equipment directly for processing and incorporation by Contractor in lieu of Contractor providing materials, products or equipment specified in the Contract Documents to be provided by Contractor as part of the Work.

**2.5.2 Deleted Work.** If the materials, products or equipment provided by County pursuant to Paragraph 2.5.1, above, then a Change Order shall be executed deleting such materials, products or equipment from the Work along with a Contract Adjustment reducing the Contract Price in the manner provided for in Article 7, below, applicable to Contract Adjustments for Deleted Work.

**2.5.3 Delivery Deadlines.** Without limitation to Contractor's obligations under Article 8, below, upon receipt of written instruction by County of its intent to provide materials, products or equipment pursuant to this Section 2.6, Contractor shall notify County promptly in writing of any deadlines within which such materials, products or equipment must be received at the Site in order to avoid Delay.

**2.5.4 Delivery to Site.** Contractor shall, upon their delivery to the Site, properly receive and unload materials, products or equipment furnished by County pursuant to this Section 2.5.

**2.5.5 Care, Custody and Control.** Contractor assumes full and unconditional responsibility for care, custody and control of the materials, products or equipment that are furnished by County pursuant to this Section 2.5, whether or not they have been accepted by County, and assumes sole responsibility for any subsequent loss, injury or damage thereto occurring prior to Final Completion.

**2.5.6 Notice of Deficiencies.** Contractor shall carefully inspect any materials, products or equipment furnished by County pursuant to this Section 2.5 and immediately notify County of any defect or deficiency in such materials, products or equipment or any nonconformity in such materials, products or equipment with the requirements of the Contract Documents or with the requirements of the other documentation provided to Contractor setting forth the conditions of County's purchase. Contractor shall not accept any materials, products or equipment furnished by County with respect to which Contractor has provided such notice of defect, deficiency or non-conformity unless and until instructed to do so in writing by County.

**2.5.7 Incorporation in Work.** Contractor shall, as part of the Work and without Contract Adjustment, provide any and all processing, fabrication, cutting, shaping, fitting, assembly and installation of materials, products or equipment furnished by County pursuant to this Section 2.5 in full compliance with the requirements of the Contract Documents and the manufacturer's instructions and recommendations.

## 2.6 COUNTY INSTALLED ITEMS

Contractor shall notify County, a reasonable time in advance, of the Contractor's scheduled dates for installation of items that are specified in the Contract Documents to be placed on, attached to or incorporated into the Work by County or Separate Contractors. In the event that Contractor fails to do so or if due to Unexcused Delay the County is unable after such notice by Contractor to so place, affix or incorporate such items, then Contractor shall be responsible, in addition to any amounts due to County for liquidated damages, to reimburse County for costs of storage or rental of temporary replacement items until such time as the Work is in a condition suitable for such items to be placed, affixed or incorporated.

## 2.7 COUNTY'S ADDITIONAL RIGHTS

The rights stated in this Article 2 are in addition to and not in limitation of any other rights of County granted elsewhere in the Contract Documents or under Applicable Laws.

# ARTICLE 3 CONTRACTOR PERFORMANCE

## 3.1 CONTRACTOR STATUS

**3.1.1 Independent Contractor.** Contractor is, and shall at all times be deemed to be, an independent contractor and is wholly responsible for the performance of the obligations required of it by the terms of the Contract Documents.

**3.1.2 Agents, Employees.** Contractor wholly assumes responsibility for the acts and omissions of its agents and employees and the agents and employees of each Subcontractor, of every Tier, as they relate to the Work. Contractor, its agents and employees, shall not be entitled to any rights or privileges of County's employees and nothing contained in the Contract Documents and no course of conduct shall be construed as creating the relationship of employer and employee, or principal and agent, between County and any agent or employee of Contractor or any Subcontractor. County shall have the right, but not the obligation, to monitor the employment and other activities of Contractor and the Subcontractors to determine compliance with the terms of the Contract Documents.

**3.1.3 Licenses.** Contractor and the Subcontractors, of every Tier, shall maintain, such contracting, professional and business licenses as may be required by Applicable Laws for the duration of time that Contractor is performing the Work under the Contract Documents, including the period of any warranty provided covering all or any portion of the Work.

**3.1.4 Subcontractors.** Contractor is responsible to County for acts and omissions of the Subcontractors and their agents and employees and other persons performing portions of the Work under a contract with a Subcontractor, of any Tier.

**3.1.5 Design Services.** Contractor shall provide professional services if such services are expressly, or by reasonable implication, required by the Contract Documents for a portion of the Work or are required in order for Contractor to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Professional design services or certifications so required of Contractor shall be furnished by design professionals exercising the highest standard of care and utilizing designs and engineering that comply with all systems, materials or equipment, performance and design criteria set forth in the Contract Documents. Certification by a properly licensed design professional, including such professional's signature and seal, shall appear on all drawings, calculations, specifications, certifications and other documents prepared by such professional. Submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted. County, Architect and County Consultants shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals.

## 3.2 REVIEW OF DOCUMENTS, SITE AND EXISTING IMPROVEMENTS

**3.2.1 Contractor's Duty of Review.** Contractor's submission of its Bid and execution of the Construction Contract constitutes its representation, acknowledgement and agreement that it had sufficient time, access and opportunity prior to the Bid Closing Deadline to conduct a careful and thorough examination, to its satisfaction, of:

.1 the Bidding Documents, Contract Documents, Reference Documents and other information provided by County to Contractor prior to the Bid Closing Deadline concerning the Project, Site or Existing Improvements;

.2 the visible conditions at the Site and its surroundings, visible conditions of Existing Improvements and their existing uses by County or the public, routes of ingress and egress, and local conditions in the vicinity of the Site (including, without limitation, sources and availability of labor, materials and equipment);

.3 the status of any construction at the Site concurrently under construction; and

.4 all information concerning visible and concealed conditions above and below the surface of the ground at the Site and in Existing Improvements (including, without limitation, surveys, reports, data, as-built drawings of Existing Improvements and utility sources, capacities and locations) that was either (1) provided by County to Contractor or other Bidders (including, but not limited to, the Bidding Documents and Reference Documents) or (2) reasonably available to Contractor for review in the public records of the County of Riverside or the City in which the Project is located.

### 3.2.2 Contract Adjustments.

.1 **Differing Site Conditions.** Except as otherwise provided in Subparagraph 3.2.3, below, the Contractor's right to a Contract Adjustment in the event Contractor encounters conditions at the Site or in Existing Improvements that vary from those indicated by the Contract Documents or other information that was either reviewed by Contractor or that Contractor was given the opportunity to review prior to the Bid Closing Deadline shall be governed exclusively by Paragraph 4.3.8, below, pertaining to Differing Site Conditions.

.2 **Design Discrepancies.** Except as otherwise provided in Subparagraph 3.2.3, below, and subject to the Contractor's compliance with the other provisions of the Contract Documents governing the Contractor's right to a Contract Adjustment (including, without limitation, Article 7 and Article 8, below), Contractor shall be entitled to a Contract Adjustment due to Design Discrepancies, subject to the following conditions and limitations:

(1) **Compensable Change.** There shall be no Contract Adjustment to the Contract Price for Extra Work that the Contractor is required to perform as a result of a Design Discrepancy unless all of the following conditions have been met prior to Contractor or any Subcontractor performing any portion of the Work involving or affected by such Design Discrepancy:

(a) the circumstances giving rise to such Extra Work conform to all of the requirements of Subparagraph 1.1.29.2 through Subparagraph 1.1.29.4, above, applicable to Compensable Changes;

(b) Contractor has submitted to County and Architect a Request for Information in compliance with Paragraph 3.2.5, below, seeking clarification of such Design Discrepancy;

(c) Contractor has submitted to County a timely and complete Notice of Change in accordance with Article 7, below, describing such Extra Work in detail;

(d) Contractor has received a Construction Change Directive signed by County in accordance with Article 7, below, directing that Contractor perform the portion of the Work in question; and

(e) unless otherwise provided in such Construction Change Directive, Contractor has submitted to County a Change Order Request in accordance with the requirements of Article 7, below, setting forth the particulars of its request for Contract Adjustment on account of such Extra Work.

(2) **Compensable Delay.** There shall be no Contract Adjustment to the Contract Price or Contract Time for Delay as a result of a Design Discrepancy unless all of the following conditions have been met prior to Contractor or any Subcontractor performing any portion of the Work involving or affected by such Design Discrepancy:

(a) if the Delay is the result, in whole or in part, of Extra Work, all of the requirements of Subparagraph 3.2.2.2 (1), (a) through (e), above, have been met;

(b) the circumstances giving rise to such Delay conform to all of the requirements of Subparagraph 1.1.30.2 and Subparagraph 1.1.30.3, above, applicable to Compensable Delay; and

(c) Contractor has submitted to County a timely and complete Notice of Delay and a timely and complete Request for Extension in accordance with Article 8, below, setting forth the particulars of its request for Contract Adjustment on account of such Compensable Delay.

(3) **Differing Site Conditions.** The Contractor's right to a Contract Adjustment as a result of variances between (a) the Contract Documents or other documents or information described in Paragraph 3.2.1, above, that, prior to the Bid Closing Deadline was either reviewed by Contractor or was available to Contractor for review prior to the Bid Closing Deadline and (b) conditions at the Site or in Existing Improvements shall, notwithstanding the fact that the circumstances asserted by Contractor as a basis for such Contract Adjustment may involve, relate to or arise out of a Design Discrepancy, be governed by the provisions of the Contract Documents setting forth the Contractor's right to Contract Adjustments on the grounds of Differing Site Conditions.

### 3.2.3 WAIVER BY CONTRACTOR.

**CONTRACTOR AGREES THAT IT SHALL NOT BE ENTITLED TO, AND HEREBY CONCLUSIVELY WAIVES, ANY RIGHT TO CONTRACT ADJUSTMENT, AS WELL AS THE RIGHT TO ANY OTHER OR FURTHER RECOURSE OR RIGHT OF RECOVERY FROM COUNTY, ON ACCOUNT OF LOSSES OR DELAYS THAT ARE A RESULT OF EITHER A DIFFERING SITE CONDITION OR A DESIGN DISCREPANCY, IF PRIOR TO THE BID CLOSING DEADLINE SUCH DIFFERING SITE CONDITION OR DESIGN DISCREPANCY WAS:**

(1) **DISCOVERED BY CONTRACTOR AND CONTRACTOR, NOTWITHSTANDING SUCH DISCOVERY, FAILED TO REPORT SUCH DIFFERING SITE CONDITION OR DESIGN DISCREPANCY TO COUNTY IN WRITING PRIOR TO THE BID CLOSING DEADLINE;**

(2) **ALTHOUGH NOT ACTUALLY DISCOVERED BY CONTRACTOR PRIOR TO THE BID CLOSING DEADLINE WAS REASONABLY DISCOVERABLE BY CONTRACTOR UNDER THE STANDARD OF PERFORMANCE SPECIFIED IN THE CONSTRUCTION CONTRACT, INCLUDING, WITHOUT LIMITATION, A DIFFERING SITE CONDITION OR DESIGN DISCREPANCY THAT WAS OVERLOOKED BY CONTRACTOR DUE TO A FAILURE BY CONTRACTOR TO FULLY FAMILIARIZE ITSELF PRIOR TO THE BID CLOSING DEADLINE WITH ANY OF THE DOCUMENTS, INFORMATION OR CONDITIONS REFERRED TO IN PARAGRAPH 3.2.1, ABOVE.**

3.2.4 **Continuing Obligation.** In addition and without limitation to Contractor's obligations under Paragraph 3.2.1, above, or elsewhere in the Contract Documents, Contractor shall have the continuing obligation until Final Completion to promptly report to County, by means of submission by Contractor of a Request for Information that complies with the requirements of Paragraph 3.2.5, below, any and all of the following:

.1 information contained in the Bidding Documents, Contract Documents, Reference Documents or other documentation that was either reviewed by Contractor or that Contractor was given the opportunity to review prior to the Bid Closing Deadline, as well as any visible conditions at the Site, in Existing Improvements or in the vicinity of the Project, that Contractor knows, or in the exercise by Contractor of its duties under the Standard of Performance should have known, may render a portion of the Work in any respect, wholly or partially, unsuitable or incomplete to meet the requirements of the Contract Documents, the Design Intent or Applicable Laws, and

.2 conditions in the Work that constitute Defective Work or that cause or are likely to cause any other portion of the Work to be Defective Work.

Without limitation to County's other rights under the Contract Documents, any portion of the Work, Existing Improvements or the work of Separate Contractors or County's own forces requiring replacement, repair or correction due to a failure by Contractor or any Subcontractor, of any Tier, to comply with its continuing obligation under this Paragraph 3.2.4 shall be promptly replaced, repaired or corrected to County's satisfaction, at Contractor's Own Expense.

### 3.2.5 Requests for Information.

**.1 Time for Submittal.** Requests for Information shall be submitted no later than three (3) Days after the date Contractor learns of the circumstances giving rise to the question contained in the Request for Information. Requests for Information shall be submitted by or through the Contractor and not directly by Subcontractors.

**.2 Content.** Each Request for Information shall, in addition to the Contractor's specific question or request, include the following:

(1) a detailed description of the circumstances giving rise to the Contractor's request or question, including, without limitation, any related Design Discrepancy;

(2) Contractor's request for clarification, including, without limitation, any request for further detailing or correction of the Contract Documents; and

(3) a statement of whether Contractor believes it is entitled to a Contract Adjustment by reason of the circumstances described.

**.3 Form.** Contractor shall submit Requests for Information using forms provided or approved by County.

**.4 Unnecessary, Multiple Requests.** Contractor shall carefully review, coordinate and consolidate (where appropriate to prevent piecemeal submission) Requests for Information (whether originating with Contractor or the Subcontractors) prior to submitting them in order to eliminate unnecessary or duplicative requests.

**.5 Responses.** Responses to Requests for Information shall be furnished with reasonable promptness so as to not unreasonably Delay progress of the Work; provided, however, that the timing of a response by the Architect, County or a County Consultant to a Request for Information shall not constitute grounds for a Contract Adjustment unless Contractor has complied with the requirements set forth in this Paragraph 3.2.5 and, if applicable, Paragraph 2.1.3, above.

**.6 Back Charges by County.** County shall have the right to deduct from payments due to Contractor sums expended by County for the services of the Architect, Inspectors of Record or County Consultants due to a failure by Contractor to comply with this Paragraph 3.2.5.

### **.7 WAIVER BY CONTRACTOR.**

**FAILURE BY CONTRACTOR TO SUBMIT A REQUEST FOR INFORMATION IN ACCORDANCE WITH AND UNDER CIRCUMSTANCES IN WHICH A REQUEST FOR INFORMATION WAS REQUIRED BY THIS PARAGRAPH 3.2.5 SHALL RESULT IN CONTRACTOR WAIVING ITS RIGHT TO A CONTRACT ADJUSTMENT ON ACCOUNT OF ANY LOSS OR DELAY THAT COULD HAVE BEEN AVOIDED IF SUCH REQUEST FOR INFORMATION HAD BEEN PROPERLY PREPARED AND TIMELY SUBMITTED.**

**3.2.6 Correction of Work.** Contractor shall, at Contractor's Own Expense, correct or replace in accordance with the direction of County any portion of the Work that is performed by Contractor or a Subcontractor knowing that it involves, or that Contractor or Subcontractor in the exercise of reasonable care and diligence should have known involves, a portion of the Contract Documents that contains an error, omission, conflict, ambiguity, lack of coordination or noncompliance with Applicable Laws, without first notifying and obtaining the written approval of County and Architect.

### 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

3.3.1 **General Obligation.** Contractor shall provide competent, fully qualified personnel to supervise, administer, manage and direct the Work, competently and efficiently, at all times devoting their best skill and attention to perform the Work in accordance with the Contract Documents.

3.3.2 **Supervisory Staff.** Contractor shall employ a competent project manager, superintendent, scheduler, forepersons and necessary assistants during performance of the Work. Contractor's superintendent and forepersons shall be present at the Site at all times that the Work is in progress and at any time that any employee of Contractor or a Subcontractor is present at the Site. Contractor's project manager and superintendent shall, unless excused from attendance by the County, attend all job meetings. Contractor's project manager and superintendent must be able to fluently read and write in English. Contractor's superintendent shall not perform the Work of any trade, pick up materials, or perform any Work not directly related to the supervision of the Work and shall be available twenty-four (24) hours a Day, seven (7) Days a week, to respond to emergencies.

3.3.3 **County Supplementary Personnel.** Without limitation upon any of the rights or remedies of the County under the Contract Documents or under Applicable Laws, in the event that Contractor fails to have personnel on Site to supervise the Work, the County shall have the right, but not the obligation, upon twenty-four (24) hours' telephonic or email notice by the County to Contractor, to provide such supervision on a temporary basis and to deduct from the sums owing to Contractor the actual costs of such temporary supervision. Contractor shall, notwithstanding the County's providing such temporary supervision, remain solely responsible for all actions and omissions of its personnel and of the Subcontractors.

3.3.4 **Means, Methods, Procedures.** Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and coordinating all portions of the Work, unless the Contract Documents specify other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, Contractor shall nonetheless be fully and solely responsible for the adequacy and safe implementation of such means, methods, techniques, sequences or procedures. If Contractor believes that such specified means, methods, techniques, sequences or procedures may not be safe or adequate, Contractor shall give written notice to County and Architect and shall not proceed with that portion of the Work without further written instruction from County or Architect. In response to such notice, County may order Contractor to improve the character or increase the efficiency of the means, methods, techniques, sequences or procedures employed, and Contractor shall conform to such order; but the failure of County to order such improvement or increase of efficiency will neither relieve Contractor from its sole responsibility for safety at the Site nor relieve Contractor from its obligation to perform the Work in accordance with the Contract Documents and Applicable Laws.

### 3.4 LABOR, MATERIALS AND EQUIPMENT

3.4.1 **Costs of Work.** Contractor shall provide and pay for labor, materials, tools, equipment, machinery, water, heat, utilities, transportation, facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether incorporated or to be incorporated into the Work.

3.4.2 **Coordination.** Contractor shall provide supervision sufficient to ensure proper coordination for the timely and efficient performance and completion of the Work.

3.4.3 **Field Conditions.** Before commencing the Work or any activities on the Site, Contractor shall take field measurements and verify field conditions and carefully compare such field measurements and conditions with the information in the Contract Documents and other information obtained by or available to Contractor.

3.4.4 **Layout.** Contractor is solely responsible for (1) the accurate layout of all portions of the Work, (2) the accuracy of the Project lines and levels, (3) erection of the Work square, plumb, level, true to line and grade, in the exact plane, and to the correct elevation and (4) sloping of surfaces to drain as indicated by the Contract Documents, or, if not indicated, as needed to provide for adequate drainage.

#### 3.4.5 **Materials, Equipment**

**.1 Delivery, Storage, Inventory.** Materials and equipment shall be: (1) furnished in ample quantities and at such times as to ensure uninterrupted progress of the Work; and (2) if located on the Site, properly stored and protected as reasonable and necessary, or as directed by County, to prevent Loss from any foreseeable cause, including, without limitation, theft. In the event that County gives direction as to the location for storage or protection of materials or equipment on the Site, Contractor shall nonetheless remain solely responsible for its safe and secure storage and protection. No part of any such stored materials and equipment shall be removed from its place of storage except for immediate installation in the Work. Contractor shall keep an accurate inventory of all such stored materials and/or equipment in a manner satisfactory to County.

**.2 Purchases.** Contractor shall place orders for materials and/or equipment as specified so that delivery of same may be made without Delay to the Work. Contractor shall, upon request from County, furnish to County documentary evidence showing that orders have been placed. County reserves the right in the event Contractor fails, within three (3) Days after receipt of written notice by County to Contractor to comply with the requirements of this Subparagraph 3.4.5.2, to comply with the requirements of this Subparagraph 3.4.5.2, to deduct the costs paid or payable by County associated with such purchases from payments otherwise owing to Contractor. Contractor shall, if requested by County, accept assignment of any such contracts entered into by County without a Contract Adjustment.

**.3 Title.** No material, supplies or equipment for the Work shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies and equipment installed or incorporated in the Work and agrees upon Final Completion to deliver the Work, including the premises, land, improvements and appurtenances on or to which the Work is placed, located or affixed, to County free from any claims, liens, or charges. Contractor further agrees that neither it nor any person, firm, or corporation furnishing any materials or labor for any of the Work shall have any right of lien upon the Site, or any Existing Improvement or appurtenance thereon, except that (1) nothing stated in this Subparagraph 3.4.5.3 shall be interpreted as a waiver by Contractor or any Subcontractor of its right under Applicable Laws to serve a stop payment notice for Work that is not paid for by County as required under the terms of the Contract Documents; and (2) Contractor may install metering devices or other equipment of utility companies or political subdivisions, title to which may be retained by such utility company or political subdivision, provided that in the event of installation of any such metering device or utility equipment, Contractor shall advise County as to the owner, and the precise location, thereof.

**.4 Substitutions.** No substitution of materials, equipment, articles, processes or other items of the Work required under the Contract Documents will be made without written approval of County, which approval may be granted or denied in the sole and absolute discretion of County. With respect to any such substitution made or requested by Contractor, neither the occurrence of a substitution made or requested by Contractor nor the approval or disapproval by County of a substitution that is made in accordance with this Subparagraph 3.4.5.4 shall give rise to any right of Contractor to a Contract Adjustment. Contractor shall, notwithstanding County's or Architect's approval, remain solely responsible for the sufficiency and suitability of all substitutions requested by Contractor and approved, or otherwise made, by Contractor.

**.5 Parts List.** Contractor will provide a printed parts list for all items which might be subject to replacement and for which parts lists are either expressly required by the Contract Documents or customarily provided according to usual commercial practices.

**.6 Manuals.** As part of its obligation for submission of Record Documents, four (4) hard copies and one (1) electronic version of operations and maintenance manuals shall be prepared and transmitted by Contractor to County prior to and as a condition of Final Completion. Final Payment will not be due until County has received all such manuals and all other manuals covering the Work that are either required to be provided by the terms of the Contract Documents or if not required are customarily provided according to usual commercial practices applicable to the portion of Work involved. Operating instructions will be included within the equipment manuals and will state all information necessary for County to operate, use, maintain and service the equipment fully and efficiently.

**.7 Start Up.** Contractor will be responsible for start-up of all systems and equipment purchased as part of the Work and has included sufficient amounts in its Bid to cover contingencies arising out of the start-up of such systems and equipment. Contractor will comply fully with each manufacturer's specifications and instructions. Systems and equipment specified to be furnished with manufacturer's supervision of start-up will be placed in operation only under such supervision.



### 3.5 CONTRACTOR'S WARRANTY

**3.5.1 General Warranty.** In addition to other warranties and guarantees required by the Contract Documents, Contractor shall, and hereby does, warrant and guarantee that: (1) the Work will conform to the requirements of Contract Documents, including, without limitation, any performance standards that are part thereof; (2) all Work for which there is not a specific requirement, criteria, specification or standard set forth in the Contract Documents will conform to the Standard of Performance; (3) all labor, equipment, materials and other items of Work will be when installed new and free of liens, claims and security interests; (4) without limitation to the other requirements of this warranty, all labor, installation and workmanship will be performed in a good and workmanlike manner; and (5) all labor, materials, equipment, services and work shall be free of defects for a period of one (1) year after Final Completion. If required by County, Contractor shall furnish satisfactory evidence as to the kind and quality of services, labor, installation, materials and equipment used. Manufactured items installed in the Work, unless otherwise specifically stated in the Contract Documents, are to be installed in strict accordance with manufacturer's current printed instructions.

**3.5.2 Repair, Replacement.** Without limitation upon the County's other rights or remedies under the Contract Documents or Applicable Laws, any and all Work that, for reasons other than (1) ordinary wear and tear or (2) abuse or neglect by persons or entities other than the Contractor or the Subcontractors, is not in conformance with the warranties or guarantees required by the Contract Documents or Applicable Laws shall be repaired or replaced, together with the repair or replacement of any other Work, Existing Improvements or the work of the Separate Contractors, the County's own forces or others, which may be removed, displaced or damaged in so doing. The Contractor shall notify the County in writing upon completion of such repair or replacement. In the event of failure by the Contractor to commence and pursue with diligence said replacement or repair within ten (10) Days after being notified by the County, the County is hereby authorized to proceed with such replacement and repair as the County deems necessary and expedient and to charge such costs to Contractor at Contractor's Own Expense.

**3.5.3 Not a Limitation.** The warranties stated in this Section 3.5 are in addition to any other warranties or guarantees that are required under any other provision of the Contract Documents or Applicable Laws. Nothing stated in this Section 3.5 shall be interpreted as a limitation upon the County's rights under any warranties or guarantees provided for under any other provision of the Contract Documents or under Applicable Laws that afford the County greater rights than the rights afforded to County under this Section 3.5.

**3.5.4 Assignment.** Contractor does hereby unconditionally and irrevocably assign to County all warranties and guarantees issued or made by any Subcontractor, of any Tier (including, without limitation, any manufacturer, supplier and distributor) in connection with the Work. Such assignment shall not relieve Contractor of, or otherwise limit, any of its obligations contained in the Contract Documents, including, without limitation, the general responsibility and liability of Contractor for a breach by a Subcontractor (including, without limitation, any manufacturer, supplier and distributor, of any Tier) of a warranty or guarantee given by such Subcontractor in connection with the Work.

**3.5.5 Close-Out.** Unless sooner requested by County, Contractor shall furnish to County, as part of the Close-Out Documents and as a condition to Final Payment, all written guarantees or warranties that are required by the terms of the Contract Documents. All such guarantees and warranties shall be: (1) in writing; (2) indexed and bound; (3) accompanied by such certifications and instruction materials as may be required by the Contract Documents; and (4) issued to County or assignable by their terms, and in fact assigned, to County.

### 3.6 TAXES

**3.6.1 Payment by Contractor.** Contractor shall pay, at Contractor's Own Expense, all local, state and federal taxes, including, without limitation, all sales, consumer, business license, use and similar taxes on materials, labor or other items furnished for the Work or portions thereof provided by Contractor or the Subcontractors, of all Tier, all taxes arising out of its operations under the Contract Documents and all benefits, insurance, taxes and contributions for social security and unemployment insurance which are measured by wages, salaries or other remuneration paid to Contractor's employees. If under federal excise tax law any transaction hereunder constitutes a sale on which a federal excise tax is imposed, and the sale is exempt from such excise tax because it is a sale to a state or local government, then County, upon request, will execute documents necessary to show: (1) that County is a political subdivision of the State for the purposes of such exemption; and (2) that the sale is for the exclusive use of County. No excise tax for

such materials shall be included in any price (including, without limitation, the Bid) submitted by Contractor for the Work or for Changes in the Work.

**3.6.2 Tax Exempt Projects.** If applicable to the Project, Contractor shall comply with Applicable Laws concerning tax-exempt construction projects.

**3.6.3 Records of Taxes.** Contractor and the Subcontractors shall keep sufficient records to verify the amount of sales and use taxes paid. Copies shall be submitted with each monthly Application for Payment. Failure to keep or submit such records, resulting in the inability of County to claim a refund for taxes for such materials, shall render Contractor liable to County for the amount of such tax refund.

### **3.7 PERMITS, FEES AND LEGAL NOTICES**

**3.7.1 Permits.** Contractor shall obtain and pay for all permits and approvals that are not stated in the Contract Documents to be the responsibility of the County. Such permits and approvals that are the responsibility of the Contractor may include local building or land use permits, California Department of Fish and Game Streambed Alteration Agreements (Section 1600 et seq.), California Department of Fish and Game collection permits, U.S. Army Corps of Engineers 404 fill and dredge authorization, Clean Water Act Section 401 authorization (managed by the local California Regional Water Quality Control Boards) land owner agreements, or other regulatory permits or approvals required for the implementation of the Project. All permits, licenses and certificates obtained by Contractor shall be delivered to County prior and as a condition to Final Completion and Contractor's right to Final Payment.

**3.7.2 Applicable Laws, Notices.** Contractor shall comply with, and give notices required by, Applicable Laws bearing on performance of the Work.

**3.7.3 Bonds, Undertakings.** Contractor shall, without Contract Adjustment, procure and obtain all bonds required of the County or the Contractor by the municipality in which the Project is located or by any other public or private body with jurisdiction over the Project. In connection with such bonds, the Contractor shall prepare all applications, supply all necessary back-up material and furnish the surety with any required personal undertakings. The Contractor shall also obtain and pay, without Contract Adjustment, all charges for all approvals for street closings, parking meter removal and other similar matters as may be necessary or appropriate from time to time for the performance of the Work.

**3.7.4 Notice of Violations.** Contractor shall immediately notify County in writing of any instruction received from County, or any other Project Team member that, if implemented, would cause a violation of any Applicable Law.

**3.7.5 Governmental Authority Approvals.** Where the Contract Documents state, or Applicable Laws require, that materials, processes or procedures must be approved by a Governmental Authority, Contractor shall be responsible for satisfying the requirements and obtaining the approval of such Governmental Authority.

### **3.8 CONTRACTOR'S PERSONNEL**

**3.8.1 Key Persons.** Contractor's employees acting as project manager, scheduler and superintendent constitute Key Persons. Individuals acting as Key Persons who are not already identified in Contractor's Post-Award Submittals shall be identified in writing to County prior to commencement of the Work.

**3.8.2 Background Check.** Contractor shall perform, prior to commencing Work on the Site, a thorough background check of each of the Key Persons and shall not, without prior written approval of County, employ any person to act as a Key Person if such background check, or other information known to Contractor, discloses a felony conviction or other matter which casts any reasonable doubt on the competency, reliability or honesty of such person.

**3.8.3 Project Manager.** The Key Person acting as project manager shall be deemed to have full authority to contractually bind Contractor, including, without limitation, the authority to bind Contractor to the terms of Contract Adjustments.

3.8.4 **Transfer.** Contractor's Key Personnel are deemed of essence to the Construction Contract. No Key Person shall, for so long as he/she is employed by Contractor, be transferred to any other project nor any of his/her responsibilities reassigned at any time during performance of the Work without the prior written approval of County, which approval may be granted or withheld in County's sole and absolute discretion.

3.8.5 **Removal.** County shall have the right, at any time, to direct the removal and replacement of any Key Person if his/her performance is determined by County, in its sole and absolute discretion, to be unsatisfactory.

3.8.6 **Replacement.** Any individual proposed by Contractor as a replacement for a Key Person must be approved in advance by County, such approval not to be unreasonably withheld, after submission by Contractor to County of complete information concerning such individual's experience and qualifications.

3.8.7 **Communications.** Important communications by Key Persons shall be confirmed in writing by Contractor. Other communications by Key Persons shall be confirmed on written request in each case.

3.8.8 **Contact Information.** Contractor shall provide to County, prior to the start of the Work, telephone numbers where Key Persons can be reached 24-hours a day, 7 Days a week.

3.8.9 **Signatures.** Prior to commencing the Work, Contractor shall submit to County a facsimile of the signatures of the Key Person acting as project manager, as well as any other representatives of Contractor with authority to sign on behalf of and contractually bind Contractor.

3.8.10 **Exclusion from Site.** Contractor shall at all times maintain good discipline and order at the Site among its employees and the employees of the Subcontractors. Any person in the employ of Contractor or any of the Subcontractors, of any Tier, whom County deems, in its sole and absolute discretion, incompetent, unfit, intemperate, troublesome or otherwise undesirable shall be excluded from the Site and shall not again be employed on the Site except with written approval of County.

### 3.9 **CONTRACTOR'S CONSTRUCTION SCHEDULE**

3.9.1 **Preparation.** Within twenty-one (21) Days after issuance by County of the Notice of Intent to Award, the Contractor shall prepare and submit a Construction Schedule for the Work, both in hard copy and electronically, for the County's approval. The Construction Schedule shall in all respects conform to and be consistent with the time requirements for the Project set forth in the Construction Contract.

3.9.2 **Format.** The Construction Schedule shall be in the form of a critical path progress schedule that shows, in graphic form, a plan for performance of the Work within the Contract Time. It shall be prepared, using Primavera P3, as a time-scaled bar chart showing: (1) continuous flow from left to right and activities and milestones that are critical to Substantial Completion and Final Completion of the Work; (2) identification of "float"; and (3) a clearly highlighted critical path. Durations and specific calendar days shall be clearly and legibly shown for the early and late start and finish of each activity. With the exception of County Review Periods and Governmental Authority Review Periods, any activity with more than fifteen (15) Days in duration will be segmented into fifteen (15) Day increments. No more than ten percent (10%) of the activities shall be shown as critical. Techniques or methods designed to suppress depiction of available float are strictly prohibited.

3.9.3 **Detail.** Activities shown in the Construction Schedule shall be in sufficient detail to demonstrate a practical plan to complete the design, engineering, fabrication and construction within the Contract Time and shall, at a minimum, include the following:

- .1 the start and finish date of each activity;
- .2 the anticipated percent of completion at the end of each month;
- .3 the weighted labor value expressed as a percentage of the total labor cost of the Work for each activity;

- .4 the final manpower curves by trade;
- .5 the anticipated purchase and delivery of major materials and equipment;
- .6 the County's occupancy requirements;
- .7 receipt and incorporation of materials, products or equipment to be furnished by County (if any);
- .8 County Review Periods and County Review Dates that are acceptable to and approved by County;
- .9 Governmental Authority Review Periods; and
- .10 the activities identified as being on the critical path to Substantial Completion and Final Completion of the Work.

**3.9.4 Updates.** Throughout the performance of the Work, weekly updates shall be delivered, in hard copy and, if required by County, in an electronic form satisfactory to County. In addition, Contractor shall regularly prepare and submit to County short term, three (3) week "look-ahead" schedules generated from the Construction Schedule approved by County. Except to the extent permitted by Contract Adjustment to the Contract Time approved by County in a duly executed Change Order or Unilateral Change Order, in no event shall the Contractor's updates or "look ahead" schedules alter the dates for Substantial Completion or Final Completion set forth in the Construction Schedule approved by County.

**3.9.5 Governing Schedule.** The governing schedule for the Work shall be the updated Construction Schedule approved by the County. Unless otherwise directed in a writing signed by County, no other schedule shall be used or relied upon by the Contractor or its Subcontractors in planning or performing the Work or in connection with any request for a Contract Adjustment to the Contract Time.

**3.9.6 Submittal Schedule.** Within twenty-one (21) Days after the receipt by the Contractor of the Notice of Intent to Award, the Contractor shall prepare and submit, in accordance with the Contract Documents, a Submittal Schedule for the County's approval. The Submittal Schedule shall be coordinated with the Construction Schedule and allow time for review of the Submittals as may be required by the Contract Documents, or if none is required, a reasonable time for such review. Contractor shall keep the Submittal Schedule current and updated in the same manner as required for updating of the Construction Schedule.

**3.9.7 Schedule Responsibility.** Contractor is and shall remain solely responsible, notwithstanding the County's review or approval thereof, for the accuracy, suitability and feasibility of all schedules it prepares for the Project, including, without limitation, the Construction Schedule, Submittal Schedule, "look ahead" schedules, recovery schedules and any updates thereof.

**3.9.8 Condition of Payment.** Compliance by Contractor with the requirements of this Section 3.9 and the other provisions of the Contract Documents pertaining to preparing, submitting, revising and updating the Construction Schedule and Submittal Schedule is a condition to County's obligation to make payment to Contractor. Recognizing that scheduling is a continuing, cumulative and recurring obligation, failure by County or to assert a right to withhold payment under this Paragraph 3.9.8 due to a noncompliance by Contractor with its schedule obligations shall not waive or diminish the County's right to withhold or disapprove of future payments on account of such prior, or any other past or future, noncompliance of the same or similar nature.

**3.9.9 Scheduling by County.** Without limitation to County's other rights under the Contract Documents, if Contractor fails after written notice by County to perform any part of its obligations relating to scheduling, County shall have the right, but not the obligation, to retain one or more schedule consultants to perform, in whole or in part, the Contractor's obligations or supplement the scheduling services provided by Contractor and to reimburse County for the costs of such consultant services by withholding such costs from payments to Contractor.

### 3.10 DOCUMENTS AT SITE, REPORTING, MEETINGS

#### 3.10.1 Documents at Site

**.1 Contract Documents, Submittals.** Contractor shall at all times while performing Work at the Site maintain, in good order, at the Site: (1) one legible set of the permitted Contract Documents; (2) one legible copy of the current version of the other Contract Documents; (3) one legible and current version of approved Shop Drawings, Product Data, Samples and other Submittals; (4) one approved Storm Water Pollution Prevention Plan (SWPPP); and (5) one copy of all reports prepared pursuant to the Mitigation, Monitoring, and Reporting Program (MMRP) requirements of the California Environmental Quality Act.

**.2 Record Documents.** Contractor shall maintain Record Drawings and Specifications in a satisfactory record condition by posting, on a weekly basis (or, in the case of building or site mechanical, electrical, plumbing or fire sprinkler systems, as soon thereafter as is reasonable and practical), thoroughly and neatly, on the Drawings and Specifications all Changes to the Work and the location of the Work, including, without limitation, the location of portions of the Work shown diagrammatically, as occurs in the actual construction of the Work. The Record Drawings and Specifications and other Record Documents shall be prepared or converted, if requested by County, to electronic form (such as, AutoCAD, Adobe Acrobat or other software satisfactory to County). All Record Drawings and Specifications and other Record Documents shall be deemed the sole property of County and, at the earlier of Final Completion or termination of the Construction Contract, shall be turned over to County. At the time they are so turned over to County, they shall be manually signed by Contractor's superintendent certifying that, to the best of his/her knowledge, they are true and accurate and that the indications thereon represent the actual condition of the Work.

**.3 Availability for Review.** Copies or originals of all documents required to be maintained by Contractor at the Site or required to be submitted to County or the Architect shall be available at all times at the Site while Work is being performed for review by County, Inspector of Record, Architect and Governmental Authorities.

**.4 Condition of Payment.** Compliance by Contractor with the requirements of this Paragraph 3.10.1 shall be deemed a condition to Contractor's right to payment upon its Applications for Payment.

#### 3.10.2 Daily Reports.

**.1 Delivery.** At the end of each Day that Contractor performs the Work on the Site, Contractor shall submit a daily report to County (on the form provided or approved by County) together with applicable delivery tickets for all labor, materials and equipment furnished that Day. If requested by County, daily reports shall be delivered electronically.

**.2 Content.** Daily Reports shall include the following information:

hours worked. **(1) Labor** - The names of the workers, and for each such worker his/her classification and

quantity used. **(2) Material** - A list of the different materials used and for each different material the

**(3) Equipment** - The type of equipment, size, identification number, and hours of operation, including loading and transportation, if applicable.

**(4) Inspection and Testing Activities** - A list of inspections performed by name of inspector and testing company and the type of inspection, items of the Work involved and a description of the outcome of such inspection or test.

purpose of visit. **(5) Visitors, Guests, Dignitaries** - A list of visitors and guests by name, title, company and

(6) Areas of the Work – A statement of the areas of the Site on which the Work was performed and a detailed description of the stage, status and progress of the Work in each such area at the beginning and end of the Day.

(7) Accidents, Delays, Defective Work – A description in detail of any injuries to the workers, accidents or delays that occurred or Defective Work that was encountered.

(8) Other Services and Expenditures – A description of other services and expenditures in such detail as County may require.

.3 **Payment.** Timely and complete submission of daily reports by Contractor shall be a condition to Contractor's right to payment under the Construction Contract.

3.10.3 **Progress Meetings.** Contractor shall attend all progress meetings at the Site, at which meetings progress of the Work shall be reported in detail with reference to the then-current updated Construction Schedule approved by the County. Progress meetings shall be held weekly, or at such other time or frequency as County, in its sole and absolute discretion, deems necessary. A representative of each Subcontractor then actively performing Work, or immediately scheduled to become active, shall have a competent and knowledgeable representative present at such progress meeting to report on the condition of the Work of such Subcontractor and to receive relevant information. Meeting notes shall be taken by the County or Architect and distributed to all meeting attendees and all other affected parties.

3.10.4 **Notice Requirements.** Under no circumstances shall information contained in Contractor's daily job reports, monthly reports or job meeting minutes relieve Contractor of its obligations to comply with, serve as a substitute for, nor constitute a waiver by County of its right to insist upon, Contractor's compliance with the provisions of the Contract Documents relative to timely and complete notice to County of Changes, Delays, Claims or other matters for which written notice is required by the Contract Documents.

3.10.5 **Availability for Review.** Copies or originals of all Record Documents, daily reports, job meeting minutes and other documents required to be maintained or actually maintained by Contractor at the Site or required to be submitted to County or Architect shall be available at the Site for review by County, Architect, Inspectors of Record, County Consultants and Governmental Authorities.

### 3.11 SUBMITTALS

3.11.1 **Not Contract Documents.** Shop Drawings, Product Data, Samples and other Submittals are not Contract Documents. Their purpose is to demonstrate for those portions of the Work for which Submittals are required the way Contractor proposes to conform the Work to the designs and other information in the Contract Documents.

3.11.2 **Coordination with Others.** Contractor shall cooperate in the coordination of Contractor's Shop Drawings, Product Data, Samples and other Submittals with related documents submitted by the Separate Contractors.

#### 3.11.3 **Submission by Contractor.**

.1 **Submission.** All Shop Drawings, Product Data, Samples and other Submittals required by the Contract Documents shall be submitted to Architect for its review and approval, with a copy to County and to such of County's Consultants or Separate Contractors as County may direct in writing. Informational submittals (i.e., Submittals upon which no responsive action is expected) shall be limited to those Submittals so identified in the Contract Documents. Submittals made by Contractor which are not required by the Contract Documents may be returned without action.

.2 **Contractor Approval.** The Contractor shall review, stamp "approved" and submit Contractor's Shop Drawings, Product Data, Samples and other Submittals to the Architect, in accordance with the latest Submittal Schedule approved by the County. The Contractor's approval and submission of Submittals constitutes a representation that the Contractor has determined or verified materials and field measurements and conditions related thereto, and that it has checked and coordinated the information contained within such Submittals with the requirements of the Contract Documents and with the Submittals for related Work. Submittals without evidence thereon of the

Contractor's approval shall be returned, without further consideration, for resubmission in accordance with these requirements.

**.3 Transmittal.** All Submittals shall be accompanied by an accurately completed transmittal in the form required by County. With respect to Submittals of documents, the transmittal shall give a list of the numbers of the sheets submitted. All sheets shall be marked with the name of the Project and the name of Contractor shall be numbered consecutively and referenced to the sheets or paragraphs of the Drawings and Specifications affected. A separate transmittal form shall be used for each specific item or class of material or equipment for which a Submittal is required. Transmission of Submittals of various items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer's "package" or are so functionally related that expediency dictates review of the group or package as a whole. Any Submittal not accompanied by such transmittal form, or where all applicable items on the form are not completed, may be returned for re-submittal without review.

**.4 Timing.** Submittals shall be provided within the time frame specified in the Contract Documents, in accordance with the Construction Schedule and Submittal Schedule and at a time sufficiently early to allow review of the same by the Architect without causing Delay to construction progress. Contractor will be responsible to pay, at Contractor's Own Expense, additional services fees and costs incurred by County to the Architect, Inspectors of Record and County Consultants in order to expedite review of Submittals which are not submitted in a timely fashion.

**.5 Content.** Submittals shall consist of the appropriate combination of catalog sheets, material lists, manufacturer's brochures, technical bulletins, specifications, diagrams and product samples, necessary to describe a system, product or item. Submittals shall show in detail the size, sections and dimensions of all members, the arrangement and construction of all connections, joints and other pertinent details, and all holes, straps and other fittings for attaching the Work. When required by the Architect or the Contract Documents, engineering computations shall be submitted.

**.6 Professional Certifications.** When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, Architect shall be entitled to rely upon the accuracy and completeness of such calculations and certifications.

**.7 Multiple Submittals.** Except where the preparation of a Submittal is dependent upon the approval of a prior Submittal, all Submittals pertaining to the same class or portion of the Work shall be submitted simultaneously.

**.8 Notation of Revisions.** Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or other Submittals, to revisions other than those requested and approved by Architect on previous Submittals.

**.9 Duplicates.** Contractor shall be responsible for delivering duplicates of Submittals to all other persons whose work or services are dependent thereon.

**3.11.4 Review of Submittals.** Review of Submittals by Architect, County or County Consultants is subject to the limitations of Paragraph 4.2.6, below. Contractor shall, notwithstanding any review or approval thereof by County, Architect or a County Consultant, be solely responsible for the content of all Submittals. Without limitation to the foregoing, deviations in Submittals from requirements of the Contract Documents shall remain the sole responsibility of Contractor unless Contractor has specifically informed Architect in writing of such deviation at the time of submission of the Submittal and Architect has given specific written approval thereof.

**3.11.5 Contract Adjustments.** Subject to Contractor's rights and obligations under Article 7, below, revisions indicated on Shop Drawings, Product Data, Samples or other Submittals shall not be considered as a basis for Contract Adjustments.

**3.11.6 Compliance with Contract.** Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or other Submittals until the respective Submittal has been returned by the Architect with an indication that it has been reviewed and that the Work addressed by the Submittal may proceed. Such Work shall be in accordance with such Submittals, unless such Submittal indicates that there are corrections to

be made. If corrections are indicated to be made then the Work shall be in accordance with the re-submitted and corrected Submittal that is reviewed and returned to the Contractor by the Architect.

### 3.12 USE OF SITE

3.12.1 **Staging Area.** Contractor will be assigned staging space on or adjacent to the Site, and all field offices, materials and equipment shall be kept within this area. Unless otherwise required by the Contract Documents, Contractor shall be responsible for restoring such areas and surrounding areas to the condition they were in prior to Contractor's commencement of the Work.

3.12.2 **Existing Improvements.** During the installation of the Work, Contractor shall ensure that Existing Improvements are adequately protected. Upon Final Completion of the Work, all Existing Improvements not required by the Contract Documents to be demolished as part of the Work that have been damaged by the actions or inactions of Contractor or its Subcontractors shall be restored to the condition they were in prior to Contractor's commencement of the Work.

3.12.3 **Operations at Site.** Contractor shall confine its activity, access and parking at the Site to areas permitted by Applicable Laws and County and shall not unreasonably encumber the Site with materials or equipment. Contractor acknowledges that it is experienced in performing construction within limited and confined areas and spaces such as those that are anticipated to exist on this Project and agrees to assume responsibility, without a Contract Adjustment, to take all special measures (including, without limitation, those related to protection, storage, staging and deliveries) as may be necessary to adapt its performance to the constraints of the Site.

3.12.4 **Coordination.** Contractor shall coordinate Contractor's operations with, and secure the approval of, County before using any portion of the Site.

3.12.5 **Unauthorized Use.** Personnel of Contractor and the Subcontractors shall not occupy, live upon or otherwise make use of the Site during any time that the Work is not being performed at the Site, except as otherwise approved by County.

3.12.6 **Site Security.** Contractor is responsible for the security of the Site and all of the Work, as well as the work of the Separate Contractors or County's own forces that occurs on the Site. Fences, barricades and other perimeter security shall be maintained in good condition and secured with locking devices. Damage to fences, barricades or other perimeter security, regardless of the cause, shall be repaired immediately at Contractor's Own Expense. Graffiti and unauthorized postings shall be removed or painted over so as to maintain a clean and neat appearance. Mobile equipment and operable machinery shall be kept locked or otherwise made inoperable whenever left unattended.

3.12.7 **Persons on Site.** Contractor shall not allow any person, other than the workers on the Project, authorized representatives of a union, or other individuals authorized by County, to come upon any portion of the Site where the Work is being performed. Only authorized personnel will be permitted on the Site. Contractor shall at all times maintain good discipline and order among its employees and the employees of the Subcontractors. Any person in the employ of Contractor or of any Subcontractors whom County may deem, in its sole and absolute discretion, incompetent, unfit, intemperate, troublesome or otherwise undesirable shall be excluded from the Site and shall not again be employed on the Site except with written approval of County and all Losses to Contractor or County associated therewith shall be borne by Contractor at Contractor's Own Expense.

3.12.8 **County Uses and Activities.** Contractor shall, prior to performing the Work at an operating or occupied County facility, become informed and take into specific account the uses by County and others of the Site and Existing Improvements, including, without limitation, business operations, public uses, employee uses, visitor uses, planned functions and ceremonies, and coordinate its planning, staging, scheduling, barricading and other performance of the Work so as to cause the minimum amount of interference or disturbance, whether before or after operating hours.

3.12.9 **Dust, Fumes, Noise.** Contractor shall take preventive measures to minimize, and eliminate wherever reasonably possible, generation of dust, fumes and noise.



**3.12.10 Confinement of Operations.** Contractor shall confine apparatus, the storage of materials and the operations of the workers to limits indicated by Contract Documents or as otherwise directed by County in writing.

**3.12.11 Prohibited Substances.** Contractor shall not permit (1) the possession or use of alcohol or controlled substances on the Site or (2) smoking in other than designated smoking areas approved by County.

**3.12.12 Survey Markers.** Contractor shall not disturb or cover any survey markers, monuments or other devices marking property boundaries or corners. If such markers are covered they shall be uncovered and if disturbed they shall be replaced by Contractor by means of the services of a licensed land surveyor. The costs of such uncovering and replacement shall be at Contractor's Own Expense.

**3.12.13 Drainage, Erosion.** Contractor is responsible for and shall make corrections to changes in patterns of surface water drainage resulting from, and related erosion control made necessary by, the performance of the Work.

**3.12.14 Trenches.** As required by California Labor Code §6705, if the Contract Price exceeds Twenty-Five Thousand Dollars (\$25,000) and involves the excavation of any trench or trenches five (5) feet or more in depth, Contractor shall, in advance of commencing excavation, submit to County a detailed plan showing the design of shoring, bracing, sloping or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. If such plan varies from the Shoring Systems Standards established by the Construction Safety Orders of the California Division of Industrial Safety, the plan shall be prepared by a registered civil or structural engineer, employed by Contractor at Contractor's Own Expense. Nothing in this Paragraph 3.12.14 shall be deemed to allow the use of a system less effective than that required by such Construction Safety Orders. No excavation of such trench or trenches shall be commenced until such plan has been approved by County and Architect. Nothing in this Paragraph 3.12.14 shall be construed to impose any liability, including, without limitation, any tort liability, upon the County or upon any of its officers, agents, representatives or employees.

### 3.13 CUTTING AND PATCHING

Contractor shall be responsible for all cutting, fitting or patching required to complete the Work and to make its parts fit together properly both among themselves and with any Existing Improvements and the work of the Separate Contractors and of County's own forces. In all cases, cutting shall be performed under the supervision of competent mechanics skilled in the applicable trade and openings shall be cut as small as possible to prevent unnecessary damage. Contractor shall not damage or endanger a portion of the Work, Existing Improvements or fully or partially completed construction of County's own forces or of the Separate Contractors by cutting, patching, excavating or otherwise altering such construction. Contractor shall not cut or otherwise alter such Existing Improvements or construction by Separate Contractors or by County's own forces except with the written consent of such Separate Contractors or County, which consent shall not be unreasonably withheld, delayed or conditioned. When asked, Contractor shall not unreasonably withhold from the Separate Contractors or County the Contractor's consent to Separate Contractors' or County's own forces' cutting or other alteration of the Work as required to complete the work of the Separate Contractors or County's own forces.

### 3.14 UTILITIES AND SANITARY FACILITIES

**3.14.1 Contractor Responsibility.** Except as otherwise required by California Government Code §4215, Contractor shall contact all relevant utility providers and arrange for obtaining all available information, concerning location of subsurface utility lines. Prior to commencement of any digging, Contractor shall make its own investigation, including exploratory excavations, to determine the locations and type of Work which could result in damage to such utilities. In accordance with California Government Code §§4216 et seq., except in an emergency, Contractor shall contact the appropriate regional notification center at least two (2) working days, but not more than fourteen (14) Days, prior to commencing any excavation, if the excavation will be conducted in an area which is known, or reasonably should be known, to contain sub-service installations, and shall obtain an inquiry identification number from the regional notification center. Contractor shall not assume, unless actual observed surface conditions at the Site indicate otherwise, that utilities are located in the same location as indicated on the as-built records or other information obtained by Contractor. Contractor shall conduct potholing in advance of digging in any areas where there are not apparent surface conditions at the Site indicating the actual location of underground utilities and be at all times vigilant in watching for any conditions encountered, above or below the surface of the ground, that might indicate that underground utilities are at locations other than those indicated by the as-built records or other information obtained by Contractor.

Contractor shall perform its digging operations in a slow and meticulous manner so as to avoid wherever reasonably possible damaging existing underground utilities. Contractor shall, at Contractor's Own Expense, make good any Loss to County or others as a result of Contractor's failure to perform any of its obligations under this Paragraph 3.14.1. Nothing stated in this Paragraph 3.14.1 shall be interpreted as requiring Contractor to do subsurface exploration or potholing for the purpose of locating subsurface utilities at the Site prior to the Bid Closing Deadline or as precluding the Contractor from receiving a Contract Adjustment for unknown subsurface utilities constituting Differing Site Conditions that are encountered in the course of performing the Site investigation or potholing required by this Paragraph 3.14.1.

**3.14.2 County Responsibility.** If and to the extent required by California Government Code §4215, County assumes the responsibility for removal, relocation, and protection of those existing main or trunkline utility facilities located at the Site at the time of commencement of the Work that are not identified in the Contract Documents. Provided that Contractor has exercised the Standard of Care in performing the Work in accordance with the Contract Documents, Contractor shall be entitled to a Contract Adjustment for, relocating, repairing or removing any utility facilities not indicated in the Contract Documents with reasonable accuracy, including, without limitation, equipment on the Site necessarily idled thereby. Delays caused by County's or a utility owner's failure to provide for the removal or relocation of such utility facilities shall constitute a Compensable Delay. Nothing herein shall be deemed to require County to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the Site can be inferred from the presence of other visible facilities, such as buildings or meter junction boxes located on or adjacent to the Site.

**3.14.3 Temporary Utilities.** All utilities, including but not limited to electricity, water, gas and telephone, used in performance of the Work (including, without limitation, meters and temporary distribution systems from distribution points to points on Site where a utility is needed and "tap fees") shall be furnished and paid for by Contractor or, if furnished by County, shall be paid for by Contractor at Contractor's Own Expense. Upon Final Completion of the Work, Contractor shall remove all temporary distribution systems. If the Work involves an addition to an existing facility, Contractor may, with written permission of County, granted or withheld in County's sole and absolute discretion, use County's existing utilities by making prearranged payments to County for utilities used by Contractor. When it is necessary to interrupt any existing utility service to make connections, a minimum of two (2) working days' advance notice shall be given to County. Interruptions shall be of the shortest possible duration and shall be scheduled during a time of Day that minimizes its impact on the operations of the existing facility. Any Loss to County or Contractor associated with interruption of a utility service as a result of Contractor's breach of, or failure to fully comply with, its obligations under this Paragraph shall be paid for by Contractor at Contractor's Own Expense.

**3.14.4 Sanitary Facilities.** Contractor shall provide sanitary temporary toilet facilities, for the use of all the workers, in no fewer numbers than required by Applicable Laws, plus such additional facilities as may be directed by County. Such facilities shall be maintained in a sanitary condition at all times. Use of existing or permanent toilet facilities shall not be permitted except by written consent of County.

### 3.15 CLEANING UP

**3.15.1 Contractor Responsibility.** Contractor at all times shall keep the Site free from debris such as waste, rubbish and excess materials and equipment caused by the performance of the Work. At the end of each Day that Work is performed, Contractor shall not leave debris under, in or about the Site but shall promptly dispose of or remove same from the Site. Without limitation to the other clean up requirements of the Contract Documents, upon Final Completion, Contractor shall: (1) clean the interior and exterior of the buildings, including fixtures, equipment, walls, floors, ceilings, roofs, window sills and ledges, horizontal projections and any areas where debris has collected so surfaces are free from foreign material or discoloration; (2) clean and polish all glass, plumbing fixtures, finish hardware and similar finish surfaces and equipment; and (3) remove temporary fencing, barricades, planking, sanitary facilities and similar temporary facilities from the Site.

**3.15.2 Cleanup by County.** If Contractor fails upon 24 hours' notice by County to perform its obligation to clean up, County may arrange to do so, and the cost thereof shall be borne by Contractor at Contractor's Own Expense.

### 3.16 ACCESS TO THE WORK

3.16.1 **County.** County, Inspectors of Record, Architect and County Consultants, and their representatives, and such other persons as authorized by County, shall at all times have access to the Work, either in preparation or in progress. Contractor shall provide safe and proper facilities for such access so that they and their representatives may perform their functions safely.

3.16.2 **Separate Contractors.** County, using its own forces or those of Separate Contractors, may, at any time during the performance of the Work, enter the Site for the purpose of performing construction or for any other purpose. Contractor shall cooperate with County, County's own forces and Separate Contractors and not interfere with other work being done by them or on their behalf.

3.16.3 **Delivery Routes.** Contractor shall arrange for delivery of material over routes designated by County.

### 3.17 INTELLECTUAL PROPERTY RIGHTS

Contractor shall pay all royalties and license fees relating to use of Intellectual Property Rights pertaining to Work performed. Contractor shall defend suits or claims for infringement of Intellectual Property Rights and shall defend, indemnify and hold harmless the Indemnitees from Loss on account thereof in accordance with the terms of Section 3.18, below, unless the infringement is due to a particular design, process, product or product of a particular manufacturer that is required by the Contract Documents; provided, however, that if Contractor has information leading it to believe that the use of a particular design, process or product required by the Contract Documents would constitute an infringement of an Intellectual Property Right, then Contractor shall nonetheless be responsible to provide such defense, indemnification and hold harmless if such information is not promptly furnished in writing to County.

### 3.18 INDEMNIFICATION

3.18.1 **Contractor's Indemnity Obligation.** To the fullest extent permitted by Applicable Laws, Contractor agrees to indemnify, immediately defend at its own expense and hold harmless, County, Board of Supervisors, and each of their respective members, officers, employees, agents, insurers and volunteers ("Indemnitee(s)"), through legal counsel reasonably acceptable to County, from any and all Losses, whether real or alleged, regardless of whether caused in part by such Indemnitee or its agents, servants or independent contractors who are directly responsible to such Indemnitee, arising out of or relating to any of the following:

- .1 any act or omission of Contractor or a Subcontractor, of any Tier;
- .2 the activities of Contractor or a Subcontractor, of any Tier, on the Site or on other properties related to performance of the Work or the preparation for performance of the Work;
- .3 the payment or nonpayment of any Subcontractor, of any Tier, for the Work performed, except where such nonpayment is the result of a breach by County of its payment obligations under the Contract Documents;
- .4 the existence or dispersal of any Hazardous Substances or Mold on the Site as a result of the failure of Contractor or a Subcontractor, of any Tier, to comply with its obligations under the Contract Documents;
- .5 the violation by Contractor or a Subcontractor, of any Tier, of an obligation under Section 3.17, above, involving infringement of an Intellectual Property Right; or
- .6 the violation by Contractor or a Subcontractor, of any Tier, of any Applicable Law, including, without limitation, the violation of any requirement of the State of California General Permit for Storm Water Discharges Associated with Construction Activity and subsequent amendments or orders for construction activities as applicable thereto (including, without limitation, the requirements of a Storm Water Pollution Prevention Plan) or the violation of any applicable requirement of any local or regional Air Quality Management District (AQMD) (including, without limitation, a violation of any of the requirements set forth in the County MOU with AQMD dated January 6, 2004 Agenda Item 3.1 (for projects in the Coachella Valley) or AQMD Rule 403 (for projects west of the Coachella Valley));

PROVIDED, HOWEVER, that nothing contained herein shall be construed as obligating Contractor to indemnify an Indemnitee for Losses resulting from the sole negligence, active negligence or willful misconduct of such Indemnitee or its agents, servants or independent contractors who are directly responsible to such Indemnitee or from a defect in design furnished by such Indemnitee, where such sole negligence, active negligence, willful misconduct or design defect has been determined by agreement of Contractor and that Indemnitee or has been adjudged by the final and binding findings of a court or arbitrator of competent jurisdiction. In instances where the active negligence or willful misconduct of an Indemnitee or its agents, servants or independent contractors who are directly responsible to such Indemnitee or a defect in a design furnished by such an Indemnitee accounts for only a portion or percentage of the Loss involved, the obligation of Contractor will be for that portion or percentage of the Loss not due to such active negligence, willful misconduct or design defect.

**3.18.2 Indemnification of Adjacent Property Owners.** In the event Contractor enters into an agreement with the owners of any adjacent property to enter upon such property for the purpose of performing the Work or other activities incidental to the Work, Contractor shall fully indemnify, defend and hold harmless any person or entity which owns or has any interest in such adjacent property against any Loss resulting from the acts or omissions of the Contractor or its Subcontractors. The form and content of such indemnification agreement shall be approved by County prior to commencement of any Work on or around such property.

**3.18.3 Insurance and Employment Benefits.** The indemnification, defense and hold harmless obligations of Contractor under this Section 3.18, as well as any such obligations stated elsewhere in the Contract Documents: (1) shall not be limited by the amounts or types of insurance (or the deductibles or self-insured retention amounts of such insurance) which any Indemnitee, Contractor or any Subcontractor carries or is required to carry under the terms of the Contract Documents; (2) is independent of and in addition to the Indemnitees' rights under the insurance to be provided by an Indemnitee, Contractor or any Subcontractor; and (3) shall not be limited, in the event of a claim against an Indemnitee by an employee of Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, by a limitation on amount or type of damages, compensation or benefits payable by or for Contractor or Subcontractor under any worker's compensation act, disability benefit act or other employee benefit program.

**3.18.4 Subcontractor Indemnity Agreements.** Contractor agrees to obtain or cause to be obtained executed defense and indemnity agreements with provisions identical to those set forth in this Section 3.18 from each and every Subcontractor, of every Tier.

**3.18.5 Implied Indemnity Rights.** Notwithstanding anything stated in this Section 3.18 or elsewhere in the Contract Documents to the contrary, an Indemnitee's right to seek equitable indemnity and contribution from Contractor is in no way diminished, limited or precluded by any agreement by Contractor to provide express contractual indemnity to such Indemnitee. Contractor's obligations under this Section 3.18 shall be deemed to completely eliminate and preclude any right by Contractor to seek contractual or equitable indemnity or contribution from any Indemnitee for any Loss covered by the Contractor's express indemnification obligations under this Section 3.18.

**3.18.6 Obligation to Defend.** The Contractor's obligation to defend under this Section 3.18 includes, without limitation, the obligation to immediately reimburse an Indemnitee for any attorney's fees, court costs (statutory and non-statutory), arbitration and mediation expenses, professional, expert and consultant fees, investigative costs, postage costs, document copying costs, telecopy costs and any and all other costs and expenses associated with defense of such Indemnitee as and when incurred by any Indemnitee in defense of a claim by any third person or entity as a result of Contractor's failure or refusal to comply with its immediate defense obligation to such Indemnitee. Nothing stated in this Section 3.18 or elsewhere in the Contract Documents shall be interpreted as providing or implying that the obligation of Contractor to defend an Indemnitee against an alleged Loss that is within the scope of the Contractor's indemnification obligation under this Section 3.18 or under any other provision of the Contract Documents is to any extent released, excused, limited or relieved by a finding, determination, award or judgment by a court or arbitrator that the alleged Loss was due to circumstances not within the scope of such indemnification obligation.

### **3.19 LABOR, WAGES, PAYROLL RECORDS**

**3.19.1 Public Work.** This Work is a "public work" as defined in Labor Code §1720 and must be performed in accordance with the requirements of Labor Code §§1720 to 1850 and Title 8 California Code of Regulations §§16000 to 17270, which govern the payment of prevailing wage rates on public works projects.

**3.19.2 Prevailing Wage Rates.** Pursuant to the provisions of Article 2 (commencing at §1770), Chapter 1, Part 7, Division 2 of the Labor Code of California, the Board of Supervisors has obtained the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime Work in the locality in which the Work is to be performed for each craft, classification or type of worker needed to execute the Work from the Director of the Department of Industrial Relations. These rates are on file with County and copies will be made available to any interested party on request. Contractor shall post a copy of such wage rates at the Site. The adoption of such wage rates is not a representation that labor can be obtained at these rates. It is the responsibility of Contractor to inform itself as to the local labor conditions. Holiday and overtime Work, when permitted by Applicable Laws, shall be paid for at a rate of at least one and one-half times the adopted rate of per diem wages, unless otherwise specified. Holidays shall be defined in the collective bargaining agreement applicable to each particular craft, classification or type of worker employed.

**3.19.3 Unclassified Workers.** Any worker employed to perform the Work not covered by any classification listed in the general prevailing wage rate of per diem wages determined by the Director of the Department of Industrial Relations shall be paid not less than the minimum rate of wages specified therein for the classification which most nearly corresponds to the Work to be performed by him/her, and such minimum wage rate shall be retroactive to time of initial employment of such person on the Project in such classification.

**3.19.4 Per Diem Wages.** Contractor shall pay or shall cause to be paid each worker engaged in the Work not less than the general prevailing rate of per diem wages determined by the Director of the Department of Industrial Relations, regardless of any contractual relationship which may be alleged to exist between Contractor or any of the Subcontractors and such workers. Pursuant to California Labor Code §1773.1, per diem wages are deemed to include employer payments for health and welfare, pension, vacation, travel time and subsistence pay.

**3.19.5 Applicable Laws.** Contractor represents and warrants that the Contractor's Bid and the Contract Price includes funds sufficient to allow Contractor to comply with all Applicable Laws governing the labor or services to be provided. Contractor shall defend and indemnify the Indemnitees in accordance with Section 3.18, above, for any violation of any Applicable Law, including but not limited to California Labor Code §2810, and agrees to pay all assessments, including wages and penalties, made against County in relation to such violations.

**3.19.6 Posting at Site.** Contractor shall post at appropriate conspicuous points on the Site the prevailing wage rates of the Department of Industrial Relations in accordance with 8 California Code of Regulations 16100(b).

**3.19.7 Worker Hours.** As provided in Article 3 (commencing at §1810), Chapter 1, Part 7, Division 2 of the California Labor Code, eight (8) hours of labor shall constitute a legal day's work. The standard work day of any worker employed at any time by Contractor or any of the Subcontractors performing the Work, or any part of the Work, shall, except as hereinafter provided, be limited and restricted by Contractor to eight (8) hours per day, between the hours of 6:00 A.M. and 6:00 P.M. (unless otherwise required by Applicable Laws), plus one-half hour unpaid lunch approximately midway through the shift, provided that Contractor or any of the Subcontractors may establish a four day/ten-hour schedule consistent with Applicable Laws pertaining to payment of prevailing wages and the provisions any applicable collective bargaining agreement. A regular-work week shall constitute forty (40) hours during any one week. Notwithstanding the provisions hereinabove set forth, the parties hereto may agree to changes in the work day or the work week as permitted by Applicable Laws, and Contractor and all Subcontractors must pay the appropriate prevailing wage rate for those hours and days worked.

**3.19.8 Overtime.** Overtime work performed by employees of Contractor or any of the Subcontractors shall be compensated according to the applicable general prevailing rate established by the Department of Industrial Relations for holiday and overtime work for each craft, classification or type of worker in the locality in which the Work is to be performed.

**3.19.9 Payroll Records.** It shall be the sole responsibility of Contractor to ensure compliance with the provisions of Applicable Laws and the Contract Documents relating to maintenance and submission of payroll records. Pursuant to the provisions of California Labor Code §1776, Contractor shall keep, and shall cause each Subcontractor performing any portion of the Work to keep, accurate certified payroll records, showing the name, address, social security number, worker classification and straight-time and overtime hours worked each Day and week, and the actual per diem wages paid to each journeyman, apprentice, worker or other employee employed by Contractor in connection with the Work. Certified payroll records must be in the payroll reporting format prescribed by the Division of Labor Standards Enforcement. If there is no work by Contractor or a Subcontractor in a given week, Contractor must keep

and submit a certified "Nonperformance" payroll record, indicating "no work" for that week. Contractor shall submit all certified payroll records to County in complete, unredacted form with an original signature on the Statement of Compliance, along with, and as a condition to, its Applications for Payment. Additionally, payroll records shall be available for inspection at all reasonable hours at the principal office of Contractor on the following basis:

.1 a certified copy of an employee's payroll record shall be made available for inspection or furnished to such employee or his or her authorized representative on request;

.2 a certified copy of all such payroll records shall be made available for inspection or furnished upon request to County, the Division of Labor Standards Enforcement and/or the Division of Apprenticeship Standards of the Department of Industrial Relations or such other person or entity as designated by County;

.3 a certified copy of all such payroll records shall be made available upon request by the public for inspection or the copying thereof, provided that (1) such request is made by the public through either County, the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement of the Department of Industrial Relations, (2) such requested payroll records have not previously been provided pursuant to Subparagraph 3.19.9.2, above, then the requesting individual or entity shall, prior to being provided the records, reimburse the costs of preparation by Contractor, the Subcontractors and the entity through which the request was made, and (3) the public shall not be given access to records at the principal office of Contractor;

.4 Contractor and each Subcontractor shall within ten (10) Days after receipt of a written request file a certified copy of such payroll records with the person or entity that requested the records;

.5 Contractor shall provide, and shall cause each Subcontractor to provide, payroll records as defined in Title 8 California Code of Regulations §16000 to County within ten (10) Days after receipt of written request, at no cost to County;

.6 any copy of such payroll records made available for inspection by, and copies furnished to, the public shall be redacted in a manner so as to prevent disclosure of an individual's name, address, and social security number, except that any copy made available for inspection by, and copies furnished to, a joint labor-management committee established pursuant to the federal Labor Management Cooperation Act of 1978 (29 U.S.C. Section 175a) shall be marked or redacted only to prevent disclosure of an individual's name and social security number, and in either event, the name and address of Contractor or the Subcontractor performing the Work shall not be so obliterated; and

.7 any copy made available to an agency included in the Joint Enforcement Strike Force on the Underground Economy established pursuant to Section 329 of the Unemployment Insurance Code and other law enforcement agencies investigating violations of law shall, upon request, be provided nonr copies of certified payroll records;

.8 Contractor shall inform County concurrently with the submission of its initial Application for Payment, of the location of such payroll records, including the street address, city and county, and thereafter shall, within five (5) working days, provide a notice of any change of location and address of such payroll records.

**3.19.10 Apprentices.** Contractor acknowledges that, even if performance of the Work involves a dollar amount greater than or a number of working days greater than that specified in California Labor Code §1777.5, it shall be the sole responsibility of Contractor, for all apprentice occupations, to ensure compliance with California Labor Code §1777.5, including, without limitation, the following provisions:

.1 Apprentices of any crafts or trades may be employed and, when required by California Labor Code §1777.5, shall be employed provided they are properly registered in full compliance with the provisions of the California Labor Code.

.2 Every such apprentice shall be paid the prevailing rate of per diem wages for apprentices in the trade to which he or she is registered and shall be employed only at the work of the craft or trade to which he or she is registered.

.3 Only apprentices, as defined in California Labor Code §3077, who are in training under apprenticeship standards and written apprentice agreements under Chapter 4 (commencing at §3070), Division 3 of the California Labor Code, are eligible to be employed at the apprentice wage rate on Public Works. The employment and training of each apprentice shall be in accordance with either: (1) the apprenticeship standards and apprentice agreements under which he or she is training, or (2) the rules and regulations of the California Apprenticeship Council.

.4 Contractor and any of the Subcontractors employing workers in any apprenticeable craft or trade in performing any of the Work shall apply to the applicable joint apprenticeship committee for a certificate approving Contractor or the Subcontractor under the applicable apprenticeship standards and fixing the ratio of apprentices to journeymen employed in performing the Work.

.5 Prior to commencing the Work, Contractor shall submit contract award information to an applicable apprenticeship program that can supply apprentices to the Site of the Work. The information submitted shall include an estimate of journeyman hours to be performed under the Construction Contract, the number of apprentices proposed to be employed, and the approximate dates the apprentices would be employed. A copy of this information shall also be submitted to County if requested by County.

.6 The ratio of the Work performed by apprentices to journeymen employed in a particular craft or trade on the Work may be no higher than the ratio stipulated in the apprenticeship standards under which the apprenticeship program operates, where Contractor or the Subcontractor agrees to be bound by those standards, but, except as otherwise provided in this Paragraph, in no case shall the ratio be less than one (1) hour of apprentice work for every five (5) hours of journeyman work. Apprentices may comprise up to thirty percent (30%) of the work force of each particular craft, classification or type of worker employed, unless the applicable joint apprenticeship committee establishes a lower percentage. To the extent possible, fifty percent (50%) of the apprentice work force shall consist of first-year apprentices.

.7 The interpretation and enforcement of California Labor Code §1777.5 shall be in accordance with the rules and procedures of the California Apprenticeship Council.

.8 Contractor and all the Subcontractors shall comply with California Labor Code §1777.6, which forbids certain discriminatory practices in the employment of apprentices.

.9 Contractor shall become fully acquainted with the law regarding apprentices prior to commencement of the Work, paying special attention to California Labor Code §§1777.5, 1777.6, and 1777.7 and Title 8, California Code of Regulations, §§200 et seq. Questions may be directed to the State Division of Apprenticeship Standards, 455 Golden Gate Avenue, San Francisco, California.

**3.19.11 Pre-Construction Meetings, Interviews.** Contractor shall attend any pre-construction meetings held by County to discuss labor requirements. Contractor and the Subcontractors shall allow County, County Consultants and the Department of Industrial Relations, and designated representatives of each, to conduct, at their discretion, interviews of workers at the Site during working hours.

#### **3.19.12 Penalties for Violations.**

.1 **Prevailing Wage Violations.** Pursuant to California Labor Code §1775, Contractor and any of the Subcontractors shall, as a penalty, pay an amount not to exceed Two Hundred Dollars (\$200) for each Day, or portion thereof, for each worker paid less than the prevailing rates, determined by the Director of the Department of Industrial Relations, for the trade or craft in which such worker is employed by Contractor or, except as provided by said §1775, by any of the Subcontractors, of any Tier, for performance of the Work. The amount of this penalty shall be determined by the Labor Commissioner and shall be based on consideration of both: (1) whether the failure of Contractor or the Subcontractor to pay the correct rate of per diem wages was a good faith mistake and, if so, whether the error was promptly and voluntarily corrected upon being brought to the attention of Contractor or the Subcontractor; and (2) whether Contractor or the Subcontractor has a prior record of failing to meet its prevailing wage obligations. The difference between the amount owed to each worker pursuant to such prevailing wage rates, and the amount paid to each worker for each Day or portion thereof for which each worker was paid less than the prevailing wage rate, shall be paid to each worker by Contractor.

**.2 Working Hour Violations.** Pursuant to Labor Code §1813, Contractor shall pay a penalty of Twenty-Five Dollars (\$25) per worker employed in the performance of the Work by Contractor or by any of the Subcontractors for each Day during which such worker is required or permitted to work more than eight (8) hours in any Day and forty (40) hours in any one calendar week in violation of the provisions of Article 3 (commencing at §1810), Chapter 1, Part 7, Division 2 of the California Labor Code.

**.3 Payroll Record Violations.** Pursuant to California Labor Code §1776, Contractor shall in the event of a failure to comply within ten (10) Days with any written notice requesting the records enumerated in subdivision (a) of said §1776, pay a penalty of One Hundred Dollars (\$100) for each Day, or portion thereof, for each worker, until Contractor has strictly complied with such request. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due.

**.4 Apprenticeship Violations.** Pursuant to California Labor Code §1777.7, if Contractor or the Subcontractor is determined by the Chief of the Division of Apprenticeship Standards (the "Chief") to have knowingly committed a first-time violation of California Labor Code §1777.5, Contractor or the Subcontractor shall pay, as a civil penalty, an amount not exceeding One Hundred Dollars (\$100) for each full Day of noncompliance, provided that the amount of this penalty may be reduced by the Chief if the penalty would be disproportionate to the severity of the violation. In lieu of this penalty, the Chief may, for a first-time violation and with the concurrence of the joint apprenticeship committee, order Contractor or the Subcontractor to provide apprentice employment equivalent to the work hours that would have been provided for apprentices during the period of noncompliance. If such violation by Contractor or the Subcontractor is a second or subsequent violation committed within a three (3) year period from a previous violation of §1777.5, Contractor or the Subcontractor shall pay, as a civil penalty, to County the sum of not more than Three Hundred Dollars (\$300) for each full Day of noncompliance. County shall withhold the amount of the civil penalty from contract progress payments then due or to become due. In addition, if Contractor or the Subcontractor is determined to have knowingly committed a serious violation of any provision of §1777.5, the Chief may deny to Contractor or the Subcontractor, and to its responsible officers, the right to bid on or be awarded a contract to perform work as a subcontractor on any subsequent project for County for a period of up to one (1) year for the first violation and for a period of up to three (3) years for a second or subsequent violation.

**3.19.13 Subcontractor Provisions.** Contractor shall include, and shall require the Subcontractors to include, contractual provisions in all contracts they enter into for the performance of the Work requiring compliance with the provisions of this Section 3.19 at no additional cost.

**3.19.14 Condition of Payment.** Compliance by Contractor with the requirements of this Section 3.19 and each of its Paragraphs shall be a condition to Contractor's right to payment under its Applications for Payment. Without limitation to the foregoing, payments to Contractor shall not be made when payroll records are delinquent or inadequate.

### 3.20 LABOR CODE §2810

**3.20.1 Application.** The provisions of this Section 3.20 apply only if the Contractor has not executed a collective bargaining agreement covering the workers who will be employed to perform the Work.

**3.20.2 Declaration by Contractor.** If a Declaration of Sufficiency of Funds has not been submitted by Contractor as a Post-Award Submittal, then it must be submitted prior to Award. In executing the Construction Contract, Contractor warrants and represents that all of the statements contained in its Declaration of Sufficiency of Funds remain true and correct as of the date of execution of the Construction Contract and may be relied upon by County in determining whether there appears to be sufficient funds in the Contractor's Bid to allow the Contractor to comply with all Applicable Laws governing the labor or services to be provided for the performance of the Work. The truth and accuracy of the statements contained in said Declaration and in this Paragraph 3.20.2 constitute a material part of the Contractor's consideration for, and a material inducement to the County's entering into, the Construction Contract.

**3.20.3 Continuing Duty.** To the extent that any of the information provided in the Declaration of Sufficiency of Funds submitted by Contractor relating to numbers of workers or independent contractors that will be employed or utilized for performance of the Work was or is based upon a best estimate, rather than actual figures or information, then the Contractor assumes the continuing duty to the County to ascertain the actual figures and information requested in the Declaration of Sufficiency of Funds and to provide such actual figures and information to the County in the form



of a revised and updated Declaration of Sufficiency of Funds once the actual figures and information become known.

### 3.21 URBAN RUNOFF AND STORM WATER COMPLIANCE

**3.21.1 Contractor's Responsibility.** If and to the extent storm water permitting, control, mitigation or discharge control is required by Applicable Laws, the Contractor shall: (1) prior to starting any Work at the Site, sign and implement the Storm Water Management Plans or Storm Water Pollution Prevention Plans as previously prepared by the County's Consultant for civil engineering or by others; (2) take all necessary steps to monitor, report, enforce and otherwise implement and comply with the requirements of the Storm Water Permit, Storm Water Management Plans and Storm Water Pollution Prevention Plans and all Applicable Laws pertaining to the elimination or mitigation of storm water pollutant discharge to separate storm sewer systems or other watercourses, including without limitation, applicable requirements of the State Water Resources Control Board, Santa Ana, San Diego, and/or Colorado Region Water Quality Control Boards and municipal storm water management programs; (3) adhere to and implement the Special Provisions for Urban Runoff and Water Pollution Control set forth in the Specifications; and (4) ensure that the Work is constructed in conformance with those post-construction best management practices (BMPs) identified within the project-specific Water Quality Management Plan (WQMP).

**3.21.2 Inspections, Reports.** Contractor shall immediately notify the person identified to Contractor as the County's "project manager" for the Project of all inspections by Government Authorities (including, but not limited to, any regional board staff) and, if practicable, arrange for participation by such Governmental Authorities in any other pertinent inspections conducted at the Site. Contractor shall provide to County copies of all reports and monitoring information related to the matters covered by this Section 3.21.

**3.21.3 Violations.** The Contractor recognizes and understands that failure to comply with the requirements of any applicable storm water-related permit issued by the State of California of the United States pursuant to the Clean Water Act (Title 33 U.S.C. §§ 1251 et seq) and/or the Porter Cologne Water Quality Control Act (California Water Code §§13000 et seq.) is a violation of Applicable Laws. Contractor shall be responsible for all Losses and for any liability (including, without limitation, fines, penalties and other administrative liabilities and costs) imposed by Applicable Laws as a result of the Contractor's failure to comply with Applicable Laws, including, without limitation, the requirements of this Section 3.21.

**3.21.4 Condition of Payment.** Compliance by the Contractor with the requirements of this Section 3.21 shall be a condition to the Contractor's right to payment under its Applications for Payment.

**3.21.5 Costs of Compliance.** The Contractor represents and warrants that it has included in its Bid all costs of compliance with the requirements of this Section 3.21.

### 3.22 SOLID WASTE MANAGEMENT

Contractor shall comply with all provisions of Applicable Laws (including, without limitation, the requirements of the California Public Resources Code, rules and regulations of the California Integrated Waste Management Board and provisions of any Site-specific plans adopted by County) that are applicable to the activities of contractors performing construction or related activities on the Site. Compliance by Contractor with the requirements of this Section 3.22 shall be a condition to Contractor's right to payment under its Applications for Payment.

### 3.23 CEQA COMPLIANCE

No Work that is subject to California Environmental Quality Act (CEQA) shall proceed by Contractor until Contract Documents satisfying the CEQA process are reviewed and approved by the County. Contractor shall comply with all applicable CEQA requirements. If there is a federal nexus (e.g. a source of federal funding) to the Project, compliance by Contractor with the National Environmental Policy Act (NEPA) will be required in addition to and in conjunction with compliance with requirements of CEQA. The Contractor shall comply with the conditions identified on the Plans and Specifications for compliance with the California Environmental Quality Act, including, without limitation, all requirements pertaining to Mitigation, Monitoring, and Reporting Program (MMRP).

### 3.24 AQMD COMPLIANCE

Contractor is responsible for full and complete compliance with, as applicable: (1) AQMD Rule 403.1, County Ordinance 742, the County MOU with AQMD dated January 6, 2004 Agenda Item 3.1 (for projects in the Coachella Valley); or (2) AQMD Rule 403 (for projects west of the Coachella Valley). Any fines imposed by AQMD on the County, as well as any other Loss to County, as a result of non-compliance by Contractor with the applicable provisions of the foregoing requirements are the responsibility of Contractor and upon request by County will be paid to County by Contractor or may be withheld by County from amounts due to Contractor under its Applications for Payment.

## ARTICLE 4 CONSTRUCTION ADMINISTRATION

### 4.1 ARCHITECT

**4.1.1 Scope of Authority.** The Architect shall have the authority to act on behalf of County only as expressly provided in the Contract Documents and subject to such limitations on authority as set forth in Paragraph 4.1.2, below. As clarification of the foregoing, if the Contract Documents provide that the Architect has the right to approve of, consent to or direct that Contractor take or forbear from taking an action, such authority shall be limited to issuing such approval, consent or direction and shall not include, or be interpreted to include, authority to bind County with respect to any of the matters set forth in Paragraph 4.1.2, below. If Contractor's compliance with such approval, consent or direction of the Architect would involve or require authorization by County within the scope of the matters set forth in Paragraph 4.1.2, below, Contractor has the obligation, in addition to complying with the Architect's approval, consent or direction, to take steps in accordance with the Contract Documents to obtain such authorization of County as may be required and failing to do so shall not have any right to recourse or recovery from County on account of Contractor's action taken or Work performed in response to such approval, consent or direction by Architect.

**4.1.2 Limitations on Authority.** Without limitation to the other limitations on the Architect's authority expressed or implied under Paragraph 4.1.1, above, and notwithstanding anything else set forth in the Contract Documents to the contrary, Architect does not have authority to: (1) obligate or commit County to any payment of money; (2) obligate County to any adjustment to the Contract Price or Contract Time; (3) relieve Contractor of any of its obligations under the Contract Documents; (4) approve or order any Work involving Delay or Extra Work; or (5) perform any act, make any decision or give any direction or approval that is described in these General Conditions as an act, decision, direction or approval that is to be performed, made or given by any person or entity other than Architect.

**4.1.3 Work Stoppage.** Architect's authority includes, without limitation, the authority to stop the Work whenever such stoppage may be necessary, in Architect's opinion, for the proper execution of the Work. Any Work that is stopped or disapproved by order of Architect shall be resumed if and when County so directs in writing, with or without the concurrence of the Architect.

**4.1.4 Replacement.** County may, in its sole discretion, substitute another person or entity, or add persons or entities, to perform the functions of Architect or to exercise some or all of the authority of Architect provided for in the Contract Documents.

**4.1.5 County Rights.** All rights and authority conferred upon Architect under the Contract Documents constitute rights that County may, in its sole and absolute discretion, exercise in writing on its own behalf, irrespective of whether the County has ordered the removal, replacement or a change in the authority of the Architect.

### 4.2 ADMINISTRATION OF THE CONSTRUCTION CONTRACT

**4.2.1 Observations of the Work.** Architect will visit the Site as appropriate to the stage of the Work to observe the Work in progress. Observations shall be for the purpose of ascertaining the progress of the Work and that the character, scope, quality and detail of construction (including workmanship and materials) comply with the Contract Documents, the Architect's directives, approved Submittals and clarifications issued by Architect. Observations shall be separate from any inspections which may be provided by others.

**4.2.2 Means, Methods.** Construction means, methods, techniques, sequences, procedures and safety precautions and programs in connection with the Work are solely the responsibility of Contractor. Neither County nor

Architect: (1) has control over or charge of, nor are they responsible for, Contractors or any Subcontractor's construction means, methods, techniques, sequences, procedures, safety precautions or programs in connection with the Work, all of which are, as between Contractor and County, solely Contractor's responsibility; (2) is responsible for Contractor's failure to carry out the Work in accordance with the Contract Documents; or (3) has control over, charge of, or responsibility for acts or omissions of Contractor, the Subcontractors or their agents or employees, or of any other persons performing portions of the Work.

**4.2.3 Communications by Contractor.** County shall be provided by Contractor with copies of all communications from Contractor or the Subcontractors to Separate Contractors or the Architect. Contractor shall not rely on oral or other non-written communications.

**4.2.4 Review of Applications for Payment.** If requested by County, Architect will review and certify all Applications for Payment by Contractor, including Applications for Payment requesting Progress Payments and Final Payment. In such cases, if the Architect and County do not concur in respect to the amount to be paid to Contractor, County's determination of the amount due will prevail.

**4.2.5 Rejection of the Work.** Architect will have authority to reject Work that does not conform to the Contract Documents and to require additional inspection or testing, in accordance with Article 10, below, whether or not such Work is fabricated, installed or completed. Whenever Architect considers it necessary or advisable for implementation of the intent of the Contract Documents, Architect will have authority to require additional inspection or testing of the Work in accordance with Article 10, below, whether or not such Work is fabricated, installed or completed. Neither Architect's authority to act under this Paragraph 4.2.5 nor a decision made in good faith either to exercise or not to exercise such authority, shall give rise to a duty or responsibility of Architect to Contractor, the Subcontractors, their agents or employees, or other persons performing any of the Work. County shall have the right, notwithstanding a recommendation by the Architect pursuant to this Paragraph 4.2.5 to reject a portion of the Work, to elect to accept the Work rejected by Architect and to direct in writing the manner in which the Work is to be performed and Contractor shall comply therewith.

**4.2.6 Review of Submittals.** Architect and such other County Consultants as Architect or County determines appropriate will review, approve or take other appropriate action upon the Contractor's Submittals. Such review, approval and other action taken in regard to a Submittal is for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents and is not conducted for the purpose of determining the technical accuracy and completeness of the Submittal, checking details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the sole responsibility of Contractor. Actions by Architect and County Consultants in connection with review of a Submittal by Contractor will be taken with such promptness as to cause no unreasonable Delay in the Work of Contractor or in the activities of the Separate Contractors or County, while allowing sufficient time in their judgments to permit adequate review. Whether or not County has identified a particular Submittal for review by Architect or a County Consultant, Contractor shall in all cases submit Submittals sufficiently in advance to allow time to permit adequate review by Architect and other County Consultants. Neither Architect's nor any County Consultant's review of a Submittal shall: (1) relieve Contractor of its obligations under Section 3.11, above; (2) constitute approval of safety precautions or, unless otherwise specifically stated in writing by the Architect or County Consultant at the time such Submittal is returned to Contractor; (3) be construed as an approval of any construction means, methods, techniques, sequences or procedures; and (4) if it involves review or approval of a specific item, be construed as indicating approval of an assembly of which such item is a component.

**4.2.7 Changes.** After consultation with the Architect, County will prepare the Change Orders, Unilateral Change Orders and Construction Change Directives for execution and take appropriate action thereon in accordance with Article 7, below.

#### **4.3 CLAIMS**

**4.3.1 Submission of Claims.** All Claims by Contractor shall be submitted in accordance with the procedures set forth in this Section 4.3.

**4.3.2 Arising of Claim.**

**.1 Changes.** A Claim by Contractor involving a Contract Adjustment due to a Compensable Change or Deleted Work arises upon issuance of a decision denying, in whole or in part, Contractor's Change Order Request. Such Claim shall be prepared and submitted in accordance with the requirements of this Section 4.3, including, without limitation, Paragraphs 4.3.3 through 4.3.5, below.

**.2 Other Claims.** Claims by Contractor other than those described in Subparagraph 4.3.2.1, above, arise at the time that County receives written notice by Contractor of Contractor's intent to file the Claim. Such notice of intent shall be given no later than five (5) Days after the Discovery Date relative to such circumstances (even if Contractor has not yet experienced a Loss or Delay due to such circumstances) and shall state the event or condition giving rise to the Claim and its probable effect, if any, upon the Contract Price and Contract Time. **FAILURE BY CONTRACTOR TO SUBMIT A NOTICE OF INTENT TO FILE CLAIM IN ACCORDANCE WITH THIS SUBPARAGRAPH 4.3.2.2 SHALL, IN ACCORDANCE WITH THE PROVISIONS OF SECTION 4.6 OF THE GENERAL CONDITIONS, CONSTITUTE A WAIVER BY CONTRACTOR OF THE RIGHT TO FURTHER RECOURSE OR RECOVERY UPON SUCH CLAIM.**

**4.3.3 Content of Claims.** A Claim must include the following:

- .1** a statement that it is a Claim and a request for a decision on the Claim;
- .2** a detailed description of the act, error, omission, unforeseen condition, event or other circumstance giving rise to the Claim;
- .3** supporting documentation as follows: (1) if the Claim involves a Contract Adjustment due to Compensable Change or Deleted Work, documentation demonstrating that a complete Notice of Change and Change Order Request were timely and properly submitted as required by Article 7, below; (2) if the Claim involves an adjustment to the Contract Time, documentation demonstrating that a complete Notice of Delay and Request for Extension were timely and properly submitted as required by Article 7 and Article 8, below; and (3) if the Claim does not involve a Contract Adjustment on the basis of Compensable Change or Deleted Work, documentation demonstrating that a notice of intent to file the Claim was timely and properly submitted as required by Subparagraph 4.3.2.2, above;
- .4** a detailed justification for any remedy or relief sought by the Claim, including, without limitation, all of the following: (1) a detailed cost breakdown in the form required for submittal of Change Order Requests, which complies with the prohibition on "total cost" calculations set forth in Paragraph 7.7.15, below; and (2) job cost records substantiating the actual costs that have been incurred; and
- .5** a written certification, signed by a responsible managing officer or principal of Contractor's organization who has the authority to sign contracts on behalf of Contractor and who has personally investigated the matters alleged in the Claim, in the following form:

"I hereby certify under penalty of perjury that I am a managing officer or principal of (Contractor) and that I have reviewed the Claim presented herewith on Contractor's behalf and/or on behalf of (Subcontractor(s)) and that the following statements are, to the best of my knowledge after diligent inquiry into the circumstances of such Claim, true and correct:

- (i)** the facts alleged in or that form the basis for the Claim are true and accurate;
- (ii)** I do not know of any facts or circumstances, not alleged in the Claim, that by reason of their not being alleged render any fact or statement alleged in the Claim materially misleading;
- (iii)** I have, with respect to any request for money or damages alleged in or that forms the basis for the Claim, reviewed the job cost records (including those maintained by Contractor and by any Subcontractor, of any Tier, that is asserting all or any portion of the Claim) and confirmed with reasonable certainty that the losses or damages alleged to have been

suffered by Contractor and/or such Subcontractor were in fact suffered in the amounts and for the reasons alleged in the Claim;

(iv) I have, with respect to any request for extension of time or claim of delay, disruption, hindrance or interference alleged in or that forms the basis for the Claim, reviewed the job schedules (including those maintained by Contractor and by any Subcontractor, of any Tier, that is asserting all or any portion of the Claim) and confirmed that the delays or disruption alleged to have been suffered by Contractor and/or such Subcontractor were in fact experienced for the durations, in the manner, and with the consequent effects on the time and/or sequence of performance of the Work, as alleged in the Claim; and,

(v) Contractor has not received payment from County for, nor has Contractor previously released County from, any portion of the Claim.

Signature: \_\_\_\_\_  
Name: \_\_\_\_\_  
Title: \_\_\_\_\_  
Company: \_\_\_\_\_  
Date: \_\_\_\_\_

4.3.4 **Noncompliance.** Failure by Contractor to comply with Paragraph 4.3.3, above, shall give County the right, without obligation, to deny the Claim or return the Claim without any response.

4.3.5 **Submission of Claims.**

.1 **Time for Filing.** All Claims and supporting documentation and certifications required to be submitted by Contractor must be submitted to the County within thirty (30) Days after the Claim arises (as "arises" is defined in Paragraph 4.3.2, above). No Claims by Contractor are permitted after Final Payment.

.2 **Manner of Filing.** A Claim shall be submitted by registered or certified mail, return receipt requested.

.3 **Condition Precedent.** Contractor's strict compliance with the requirements of this Section 4.3 as to a Claim shall be considered a condition precedent to Contractor's right to initiate or seek determination of its rights in any legal proceedings with respect to such Claim.

4.3.6 **Response to Claims by Contractor.**

.1 **Claims Response.** County shall provide a reasonable review and issue a written Good Faith Determination within forty-five (45) Days of receipt of the Claim, unless County and Contractor have by mutual agreement extended the time period. The written Good Faith Determination shall identify which portion of the Claim is disputed by County and which portion is undisputed.

.2 **Meeting with Board.** If County should need to submit and gain approval of the Board of Supervisors prior to providing the Contractor the written statement identifying the undisputed and disputed portions of the Claim, and the governing body does not meet within the forty-five (45) days or within the mutually agreed time extension, County shall have three (3) days following the next duly publicly noticed meeting of the Board of Supervisors after the forty-five (45) day period, or agreed extension, to provide Contractor a written statement identifying the disputed portion and undisputed portion of the Claim.

**.3 Payments on Undisputed Portion(s).** Any payment due on an undisputed portion of the Claim shall be processed and made within sixty (60) days after County issues its written statement. Amounts not paid in a timely manner shall bear interest at 7 percent per annum.

**.4 Failure of County to Respond.** If County should fail to respond to a Claim from Contractor within the time periods set forth in this 4.3.6 or otherwise meet the time requirements, the Claim shall be deemed rejected in its entirety. A Claim that is denied by reasons of County's failure to have responded to the Claim, or its failure to otherwise meet the requirements of Public Contract Code §9204, shall not constitute an adverse finding with regard to the merits of the Claim or the responsibility or qualifications of the Contractor.

#### 4.3.7 Meet and Confer.

**.1 Dispute by Contractor.** If Contractor disputes County's Good Faith Determination and written response of a Claim by Contractor, or if County fails to respond within the prescribed time set forth herein, the Contractor may demand, in writing sent by registered or certified mail return receipt requested, an informal conference to meet and confer for settlement of the issues still in dispute. Upon receipt of such demand, County shall schedule a meet and confer conference within thirty (30) Days.

**.2 Conclusion of Meet and Confer.** Within ten (10) business days following conclusion of the meet and confer conference, if the Claim or any portion thereof remains in dispute, County shall provide the Contractor with a written statement identifying the portion of the Claim still in dispute and the portion that is undisputed. Any payment due on the undisputed portion shall be processed and made within sixty (60) days after such written statement is issued. Amounts not paid in a timely manner shall bear interest at 7 percent per annum.

**.3 Mediation.** Any disputed portion of the Claim as identified by the Contractor in writing, shall be submitted to non-binding mediation with the County and Contractor sharing the associated costs equally. The County and Contractor shall mutually agree to a mediator within ten (10) business days after the disputed portion of the Claim has been identified in writing. If the parties cannot agree upon a mediator, each party shall select a mediator and those mediators shall select a qualified neutral third party to mediate with regard to the disputed portion of the Claim. Each party shall bear the fees and costs charged by its respective mediator in connection with the selection of the neutral mediator. Mediation includes any non-binding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assist the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this section.

**.4** If mediation is unsuccessful, the parts of the Claim remaining in dispute shall be subject to applicable procedures outside this section.

#### 4.3.8 Subcontractor Claims.

**.1 Subcontractor Claim.** If a subcontractor or lower tier subcontractor has a claim against the County, the Contractor may present to the County a claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that the Contractor present a claim for work which was performed by the subcontractor or a lower tier subcontractor on behalf of the subcontractor. The subcontractor requesting that the claim be presented to the County shall furnish reasonable documentation to support the claim.

**.2 Contractor Response.** Within forty five (45) days of receipt of the written request by the subcontractor, the Contractor shall notify the subcontractor in writing as to whether the Contractor presented the claim to the County and, if the Contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.

#### 4.3.9 Claims Based on Differing Site Conditions.

**.1 Contractor Responsibility.** Save and except as hereinafter provided in this Paragraph 4.3.9 for Contract Adjustments due to Differing Site Conditions, Contractor agrees at Contractor's Own Expense to assume the risk and costs of Extra Work and Delay due to concealed or unknown conditions, surface or subsurface, at the Site or in Existing Improvements.

**.2 Differing Site Conditions.** Differing Site Conditions are those conditions at the Site or in Existing Improvements and not otherwise reasonably ascertainable by Contractor in the performance of its obligations under the Contract Documents (including, without limitation, conditions not reasonably ascertainable by Contractor from documents or information described in Paragraph 3.2.1, above, that were provided or available to Contractor for its review prior to the Bid Closing Deadline) that constitute: (1) hazardous materials that constitute hazardous waste, as defined in California Health and Safety Code §25117, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of Applicable Laws; (2) subsurface or concealed conditions at the Site or concealed conditions in Existing Improvements which differ materially from those indicated by the Contract Documents or other information that was either reviewed by Contractor or that Contractor was given the opportunity to review prior to the Bid Closing Deadline; or (3) unknown physical conditions at the Site or concealed conditions in Existing Improvements of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents.

**.3 Notice of Change.** If Contractor encounters conditions it believes constitute Differing Site Conditions, then Contractor shall, before such conditions are disturbed, give Notice of Change as required by Paragraph 7.6.1, below, stating, without limitation, a detailed description and precise location of the conditions encountered.

**.4 Investigation by County.** Upon receipt of notice from Contractor as required by Subparagraph 4.3.9.3, above, County shall promptly investigate Contractor's report of Differing Site Conditions.

**.5 Change Order Request.** If Contractor intends to seek a Contract Adjustment based upon Differing Site Conditions, it shall submit a complete and timely Change Order Request in accordance with Paragraph 7.6.2, below, setting forth its request for a Contract Adjustment.

**.6 Contract Adjustments.** If, following Contractor's compliance with its obligations under this Paragraph 4.3.9, County finds that Differing Site Conditions exist, then, unless the Contractor's right to Contract Adjustment has been waived as pursuant to Paragraph 3.2.3, above, a Contract Adjustment shall be made for the resulting Compensable Change and Compensable Delay, in such amount and duration as County determines by issuance of a Good Faith Determination are reasonable and permitted by these General Conditions.

#### **.7 WAIVER BY CONTRACTOR.**

**FAILURE BY CONTRACTOR TO STRICTLY COMPLY WITH THE REQUIREMENTS OF THIS PARAGRAPH 4.3.9 PERTAINING TO CONTRACT ADJUSTMENT BASED ON A CLAIM FOR DIFFERING SITE CONDITIONS SHALL, IN ACCORDANCE WITH THE PROVISIONS OF SECTION 4.6 OF THE GENERAL CONDITIONS, CONSTITUTE A WAIVER BY CONTRACTOR OF THE RIGHT TO FURTHER RECOURSE OR RECOVERY UPON SUCH CLAIM.**

**.8 Final Completion.** No claim by Contractor for additional compensation for Differing Site Conditions shall be allowed if asserted after Final Payment.

**4.3.10 Continuous Work.** Contractor shall, notwithstanding the existence of a Claim by Contractor that is disputed by County, maintain continuous performance, without interruption, suspension or slowing, of the Work and its other obligations (1) pending issuance by County of a Good Faith Determination of the Claim and (2) thereafter in compliance with the terms of such Good Faith Determination.

#### **4.4 NOTICE OF THIRD-PARTY CLAIMS**

County shall provide notification to Contractor within a reasonable time after receipt of any third-party claim relating to the Construction Contract. County shall be entitled to recover from Contractor its reasonable costs of providing such notification.

#### **4.5 WAIVERS OF RIGHTS BY CONTRACTOR**

**COUNTY AND CONTRACTOR ACKNOWLEDGE THAT IT IS IN THE INTERESTS OF BOTH PARTIES THAT CHANGES, DELAYS AND CLAIMS BE IDENTIFIED, QUANTIFIED, EVALUATED AND FINALLY RESOLVED PROMPTLY, CONTEMPORANEOUSLY WITH THE CIRCUMSTANCES FROM WHICH THEY ARISE, AND THAT THERE BE CERTAINTY WITH RESPECT TO THE FINALITY OF ANY RESOLUTION OF RELATED DISPUTES. ON**

THOSE PREMISES, AND IN FURTHER RECOGNITION OF THE FACT THAT IT WOULD BE EXREMELY DIFFICULT OR IMPOSSIBLE TO QUANTIFY, DEMONSTRATE OR PROVE THE HARM TO COUNTY IF ANY OF THE FOREGOING PREMISES IS NOT ACHIEVED DUE TO A FAILURE BY CONTRACTOR TO COMPLY WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS CONCERNING TIMELY NOTICE OR SUBMISSIONS OF NOTICES AND CLAIMS RELATING TO CHANGES, DELAY AND CONTRACT ADJUSTMENTS, COUNTY AND CONTRACTOR AGREE THAT FAILURE BY CONTRACTOR TO CONFORM TO SUCH REQUIREMENTS OF THE CONTRACT DOCUMENTS SHALL IN AND OF ITSELF CONSTITUTE SUFFICIENT CAUSE AND GROUNDS, WITHOUT THE NECESSITY OF COUNTY DEMONSTRATING ANY ACTUAL HARM OR PREJUDICE, FOR IMPOSING UPON CONTRACTOR A FULL AND UNCONDITIONAL WAIVER BY CONTRACTOR OF ITS RIGHT TO A CONTRACT ADJUSTMENT AND OF ITS RIGHTS AND RECOURSE FOR RECOVERY OF ANY RELATED LOSS BY ANY LEGAL PROCESS OTHERWISE PROVIDED FOR UNDER APPLICABLE LAWS.

#### 4.6 GOOD FAITH DETERMINATIONS

Wherever in the Contract Documents it is provided that the County may or shall make a determination or decision in the exercise of good faith (including, without limitation, provisions for a Good Faith Determination by County), any such determination or decision that the person exercising such right on behalf of County believes in good faith to be a proper exercise of County's rights and to have a reasonable basis in fact, whether or not such determination is in fact proper, reasonable or correct or adjudged to be so, shall be complied with by Contractor without Delay to Contractor's performance of the Work. However, unless the Contract Documents expressly provides otherwise, neither such good faith determination or decision nor Contractor's compliance therewith shall be interpreted as precluding the Contractor from exercising its rights to seek adjudication of its rights in the manner permitted by these General Conditions or Applicable Laws.

#### 4.7 ESCROW BID DOCUMENTS

If the Bidding Documents obligate Contractor to submit Escrow Bid Documents, then submission by Contractor of its Escrow Bid Documents shall constitute a warranty and representation by Contractor that it has no other written documents or electronic files containing any information that Contractor was required to include, but failed to include, as part of its performing such obligation and Contractor agrees it shall have no right to submit for consideration by County, or offer into evidence in legal proceedings, in support of a request for Contract Adjustment or a Claim any such documentation or electronic files that Contractor so failed to include in its Escrow Bid Documents.

### ARTICLE 5 SUBCONTRACTORS

#### 5.1 SUBSTITUTION

5.1.1 **Substitutions Allowed.** There shall be no substitution of or addition to the Subcontractors except as permitted by Chapter 4 (commencing at §4100), Division 2, Part 1 of the California Public Contract Code (the "Act").

5.1.2 **Contractor's Own Expense.** Any increase in the cost or time of performance of the Work resulting from the replacement, substitution or addition of a Subcontractor shall be borne solely by Contractor at Contractor's Own Expense.

5.1.3 **Substantiation of Compliance.** At any time during performance of the Work it shall be the responsibility and burden of Contractor, if requested by County, to present clear and convincing evidence that Contractor is, and all times during the bidding and Award of the Construction Contract was, in full compliance with all of the applicable provisions of the Act. Failure by Contractor to present such evidence when requested shall be deemed a breach of this Section 5.1 and of the Act, thereby entitling County to exercise any or all of its rights and remedies under the Contract Document or Applicable Laws, including, without limitation, the right to cancel the Construction Contract or assess any penalties provided for by the Act.

5.1.4 **Splitting Prohibited.** Any attempt by Contractor to avoid compliance with the Act, such as, but not limited to, by splitting the work of subcontracts with Subcontractors into separate contracts or changes orders so as to not exceed the monetary threshold of the Act applicable to listing of Subcontractors, is strictly prohibited.



## 5.2 SUBCONTRACTUAL RELATIONS

5.2.1 **Written Agreements.** Contractor shall, by written agreement entered into between the Contractor and Subcontractors no later than twenty (20) Days after Award, require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to Contractor by terms of the Contract Documents and to assume toward Contractor all the obligations and responsibilities which Contractor, by the Contract Documents, assumes toward County and the Architect. Each subcontract agreement shall preserve and protect the rights of County and the Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against Contractor that Contractor, by the Contract Documents, has against County. Contractor shall require each first-Tier Subcontractor to enter into similar agreements with their sub-subcontractors. Copies of applicable portions of the Contract Documents shall be made available by Contractor to the first-Tier Subcontractors and each Subcontractor shall similarly make copies of such Contract Documents available to each Subcontractor of a lower-Tier with which it contracts. Without limitation to the foregoing, each contract that is entered into by a Subcontractor, of any Tier, shall, without limitation, require the Subcontractor:

- .1 to perform the Work in accordance with the terms of the Contract Documents;
- .2 to assume toward Contractor all the obligations and responsibilities which Contractor assumes toward County by the Contract Documents;
- .3 to preserve and protect the rights of County under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights;
- .4 to waive all rights (including, without limitation, rights of subrogation) that the Subcontractor or its insurers may have against County and others required by the Contract Documents to be named as additional insureds, for Losses covered by insurance carried by Contractor or County, except for such rights as the Subcontractor may have to the proceeds of such insurance held by County or such other additional insured;
- .5 to afford County and entities and agencies designated by County the same rights and remedies afforded to them under the Contract Documents with respect to access to, and the right to audit and copy at County's cost, all of the Subcontractor's books, records, contracts, correspondence, instructions, drawings, receipts, vouchers, purchase orders, memoranda and other records and documents relating to the Work and requiring the Subcontractor to preserve all such records and other items for a period of ten (10) years after Final Completion;
- .6 to recognize the rights of the County under Section 5.3, below, including, without limitation, the County's right to (1) accept assignment of the Subcontractor's agreement, (2) accept assignment of Contractor's rights as obligee under a performance bond furnished by a first-Tier Subcontractor, (3) to retain the Subcontractor pursuant to the terms of its agreement with Contractor to complete the unperformed obligations under its agreement, and, (4) if requested by the County, to require that the Subcontractor execute a written agreement on terms acceptable to the County confirming that the Subcontractor is bound to the County under the terms of its agreement with Contractor;
- .7 to submit applications for payment, requests for change orders and extensions of time and claims, and to comply with all other notice and submission requirements of the Contract Documents, sufficiently in advance to allow Contractor time to comply with its obligations under the Contract Documents;
- .8 to purchase and maintain insurance in accordance with the requirements of the Contract Documents;
- .9 to defend and indemnify the Indemnitees on the same terms as provided in Section 3.18, above;
- .10 to comply with the nondiscrimination (Article 16, below) and prevailing wage (Section 3.19, above) provisions of these General Conditions;

.11 limiting the Subcontractor's right to additional compensation or extension of time due to Differing Site Conditions and Design Discrepancies in accordance with the provisions of Section 3.2, above;

.12 to provide for a right of termination for convenience by Contractor that limits the Subcontractor's right to compensation to an allocable share of the subcontract price that corresponds to the percentage of the Work properly performed by the Subcontractor, with no additional sum payable for any other Losses, including, without limitation, prospective damages, lost profits or consequential damages, of any kind; and

.13 to provide that time is of the essence to each of the Subcontractor's obligations.

5.2.2 **Copies.** Contractor shall, upon request by County made at any time, furnish to County true, complete, and executed copies of all contracts with the Subcontractors and amendments, modifications and change orders thereto. Progress payments shall not be made for items of the Work for which County has not received such documents following request therefor by County.

5.2.3 **No Brokering.** Contractor shall not permit any portion of the Work to be contracted to a firm acting as a broker, factor or other entity not actually performing a substantial portion of the Work with its own forces; provided, however, that nothing herein shall be interpreted as precluding the right of a Subcontractor who has agreed to provide all of the materials and labor for a trade to subcontract the labor portion only to a sub-subcontractor.

5.2.4 **Third-Party Rights.** Contractor acknowledges that County is an intended third-party beneficiary to all contracts between Contractor and its first-Tier Subcontractors. Notwithstanding the foregoing or anything else to the contrary in the Contract Documents, there is no intent on the part of County or Contractor to create any rights (including, without limitation, third-party beneficiary rights) in favor of any Subcontractor, of any Tier, against County and nothing contained in the Contract Documents and no course of conduct, act or omission on the part of County shall be construed as creating a direct or indirect contractual right in favor of any Subcontractor, of any Tier, and against County.

5.2.5 **All Subcontractor Tiers.** It is the Contractor's obligation to see to it that all obligations of the Contractor are assumed by (or, "flow down") to the Subcontractors, of every Tier, by the inclusion of contractual provisions requiring each of the Subcontractors, of every Tier, to bind not only themselves but their lower-Tier Subcontractors to the obligations assumed by Contractor under the Contract Documents.

### 5.3 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

5.3.1 **Contingent Assignment.** Contractor hereby contingently assigns to County, or to such person or entity as County, in its sole and absolute discretion, designates, all of its interest in subcontracts entered into by Contractor with its first-Tier Subcontractors. If a first-Tier Subcontractor has provided a performance bond, then Contractor's rights under such performance bond are likewise hereby contingently assigned to County or its designee and provision shall be made in the performance bond for surety's consent to such contingent assignment.

5.3.2 **Acceptance by County.** The contingent assignments provided for by this Section 5.3 will be effective only as to those subcontracts and performance bonds which County or its designee accepts in writing. Said acceptance is the sole condition upon which the effectiveness of such assignments are contingent. County or its designee may accept any such assignment at any time during the course of the Work and prior to Final Completion. Such contingent assignments are part of the consideration to County for entering into the Construction Contract with Contractor and may not be withdrawn prior to Final Completion.

5.3.3 **County Obligation.** County's or its designee's sole obligation in the event it accepts a contingent assignment of a subcontract under this Section 5.3 shall be to pay in accordance with the terms of such subcontract for Work performed after written notice of acceptance of such assignment. In the event County directs that such assignment be made to County's designee, then such designee only, and not County, shall be solely liable under such assignment for Work performed after written notice of acceptance of such assignment.

### 5.4 COMMUNICATIONS BY COUNTY

County shall have the right to communicate, orally or in writing, with the Subcontractors with respect to matters that are related to Contractor's performance of its obligations under the Contract Documents. Nothing herein shall be interpreted

as extending to County the right as part of such communications to direct the manner in which any Subcontractor performs the Work. Except as otherwise provided in the Construction Contract or these General Conditions, Contractor shall be provided with a copy of all such communications that are in writing. Such communications shall not create, or be interpreted as creating, any contractual obligation of County to any Subcontractor.

#### 5.5 DOCUMENT AVAILABILITY

Contractor shall make available to each proposed Subcontractor with whom it enters into a contract for performance of any portion of the Work, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound so as to ensure that all matters disclosed thereby are taken into consideration and included in the terms of such contracts and shall identify to such Subcontractor the terms and conditions of the proposed subcontract agreement which may be at variance with the Contract Documents. The Subcontractors shall similarly be required to make copies of applicable portions of such documents available to their respective proposed sub-subcontractors or sub-subconsultants.

#### 5.6 NO LIABILITY OF COUNTY

Nothing set forth in this Article 5, and no action taken by County with respect to review or approval of the Subcontractors or their contracts, shall impose any liability or responsibility upon County nor relieve Contractor of its responsibilities under the Contract Documents or Applicable Laws.

### ARTICLE 6 COUNTY'S OWN FORCES AND SEPARATE CONTRACTORS

#### 6.1 COUNTY'S RIGHT TO PERFORM CONSTRUCTION WITH OWN FORCES AND TO AWARD SEPARATE CONTRACTS

6.1.1 **Right of County.** County reserves the right to perform construction or operations related to the Project with County's own forces and to award other contracts to Separate Contractors in connection with other portions of the Project or other construction or operations on the Site.

6.1.2 **Separate Contractors.** Contractor shall ascertain to its own satisfaction the scope of the Project and the nature of any other contracts that have been or may be awarded by County to Separate Contractors in prosecution of the Project. Contractor shall look solely to such Separate Contractors, and County shall not be responsible, for any Losses for which Contractor is not provided a right or recovery by means of a right to Contract Adjustment for Compensable Change or Compensable Delay, that are suffered by Contractor or the Subcontractors, of any Tier, resulting directly or indirectly from the conduct of such work by the Separate Contractors.

6.1.3 **Coordination.** Nothing in the Contract Documents creates or will create any duty on the part of County to coordinate the Work of Contractor with the work of Separate Contractors. Contractor shall, when directed to do so by County, participate with the Separate Contractors and County in reviewing the Separate Contractors' construction schedules. Contractor and Separate Contractors will coordinate all work with the other so as to facilitate the general progress of the Project. Contractor agrees that any recovery of Losses for which Contractor is not provided a right or recovery by means of a right to Contract Adjustment for Compensable Change or Compensable Delay, that are suffered by Contractor due to a failure by a Separate Contractor to coordinate its work with the Work of Contractor will be sought directly against the Separate Contractors as set forth elsewhere in this Article 6.

6.1.4 **Disputes.** Contractor and County agree that Separate Contractors in direct contractual privity with County are third party beneficiaries of the Contract Documents, but only to the extent of claims and causes of action against Contractor arising out of or resulting from Contractor's performance or failure of performance under the Contract Documents or any act or omission of Contractor or the Subcontractors causing Loss to such Separate Contractors. Contractor consents to being sued by Separate Contractors for Losses caused by Contractor or any of the Subcontractors. Contractor hereby waives lack of privity of contract with such Separate Contractors as a defense to such actions.

6.1.5 **Remedy.** If Contractor as a result of the acts or omissions of one or more of the Separate Contractors suffers a Loss that is not compensated by means of a right given to Contractor under the Contract Documents to a

Contract Adjustment, then Contractor's sole remedy is to assert a claim or cause of action directly against the Separate Contractor(s) causing the Loss and Contractor hereby releases, acquits, holds harmless and forever discharges County of and from any and all liability for such Loss.

## 6.2 MUTUAL RESPONSIBILITY

6.2.1 **Use of Site.** Nothing contained in the Contract Documents shall be interpreted as granting Contractor exclusive use or occupancy of the Site. Contractor shall afford County's own forces and the Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities. Contractor shall not Delay the work of the Separate Contractors or County's own forces.

6.2.2 **Adjoining Work.** If part of Contractor's performance of the Work depends for proper execution or results upon construction or operations by County's own forces or Separate Contractors, Contractor shall, prior to proceeding with that portion of the Work, carefully inspect such construction and operations and promptly report in writing to the County apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Contractor will be responsible, at Contractor's Own Expense, for Losses to County resulting from any such discrepancies or defects not reported in accordance with this Paragraph 6.2.1 that were apparent or that should have been apparent to Contractor on careful inspection.

6.2.3 **Damage.** Contractor shall promptly remedy Loss caused by Contractor or its Subcontractors to completed construction or partially completed construction on the Site, or to property of County or the Separate Contractors.

6.2.4 **Disputes.** Contractor shall notify the County in writing within five (5) Days if it believes it has experienced or is experiencing any Delay or Loss due to the activities of County's own forces or the Separate Contractors or in the event of any dispute with County's own forces or a Separate Contractor.

6.2.5 **Settlement of Disputes.** If Contractor or any Subcontractor causes a Loss to a Separate Contractor, then Contractor will promptly settle the matter directly with the Separate Contractor and will defend, indemnify and hold County and the other Indemnitees harmless from any and all effects of such Loss in accordance with the terms of Section 3.18, above.

## 6.3 ALLOCATION OF CLEANUP COSTS

If a dispute arises among Contractor, the Separate Contractors and/or County as to the responsibility for maintaining the Site and surrounding area free from waste materials and rubbish, County may clean up such waste materials and rubbish and allocate the cost among those responsible as County determines in good faith to be just.

## ARTICLE 7 CHANGES IN THE WORK

### 7.1 CHANGES

7.1.1 **General.** County is authorized to make Changes in the Work in accordance with the provisions of this Article 7.

7.1.2 **Contract Adjustments.** Contract Adjustments shall only be permitted as follows: (1) the Contract Price shall only be adjusted by means of a Change Order or Unilateral Change Order for Compensable Change, Deleted Work or Compensable Delay; and (2) the Contract Time shall be adjusted by means of a Change Order or Unilateral Change Order for Excusable Delay, Compensable Delay or Deleted Work. All Contract Adjustments to the Contract Price shall conform, without limitation, to the requirements of this Article 7. All Contract Adjustments to the Contract Time shall conform, without limitation, to the applicable requirements of this Article 7 and Article 8, below.

7.1.3 **Exclusive Rights.** The rights expressly set forth in the Contract Documents for Contract Adjustments constitute Contractor's exclusive rights for additional compensation or extensions of time and are intended to be in lieu of and wholly replace any other such rights and remedies that Contractor has under Applicable Laws for recovery or

relief on account of Loss or Delay in connection with performance of the Work, it being the intent of the County and Contractor that if circumstances arise for which the Contract Documents do not provide to Contractor an express right to a Contract Adjustment, then such omission of an express right shall conclusively be deemed to mean that no right to a Contract Adjustment was intended; and, consistent with that intent, no right to a Contract Adjustment on account of such circumstances shall by any means, legal or equitable, of interpretation, construction, inference, implication or application be considered, found or adjudged to exist.

**7.1.4 Written Authorization.** Any Change performed by Contractor pursuant to any direction other than a duly authorized and executed Change Order, Unilateral Change Order or Construction Change Directive shall be at Contractor's Own Expense.

**7.1.5 Prompt Performance.** Subject to the procedures set forth in this Article 7 and elsewhere in the Contract Documents, all Changes shall be performed promptly and without Delay.

## **7.2 SIGNATURES AND AUTHORIZATIONS**

**7.2.1 Parties.** A Change Order shall be executed by County and Contractor. A Unilateral Change Order shall be executed by the County. Construction Change Directives shall be executed in accordance with Section 7.5, below.

**7.2.2 Form.** Change Orders, Unilateral Change Orders and Construction Change Directives shall be executed using forms furnished by County or, if requested by County, using forms furnished by Contractor that are approved by County.

### **7.2.3 Authorization.**

#### **.1 Compensable Changes.**

**(1) Director of Facilities Management.** A Compensable Change shall be performed by Contractor only if authorized by a Change Order, Unilateral Change Order or Construction Change Directive signed by the Director of Facilities Management in accordance with the requirements of this Article 7; provided, however, that the Director of Facilities Management's authority to bind the County to a Contract Adjustment shall be subject to the limitations of Public Contract Code §20142.

**(2) County's Project Manager.** The person identified by County as its "project manager" for the Project shall have the right to exercise the Director of Facilities Management's authority under this Paragraph 7.2.3, but only if and to the extent that such authority is expressly given to such project manager in a writing signed by the Director of Facilities Management (and not by a designee of the Director of Facilities Management).

**(3) Board of Supervisors.** Except as otherwise provided in Subparagraph 7.2.3.1 (4), below, if a Contract Adjustment increasing the Contract Price would exceed the limitations of Public Contract Code §20142, then in addition to written authorization by the Director of Facilities Management, such Compensable Change shall be performed only if approved by a vote of the Board of Supervisors in accordance with the requirements of Applicable Laws.

**(4) Disputed Changes.** If a dispute arises between County and Contractor over (a) whether a particular portion of the Work constitutes a Compensable Change or (b) the amount of the Contract Adjustment to which Contractor is entitled on account of a Compensable Change, then, notwithstanding such dispute, the Contractor shall, if ordered to do so in a Construction Change Directive signed by the Director of Facilities Management, perform the disputed Work without Delay. Such direction by County shall not be interpreted as an agreement or admission by County that the disputed Change constitutes Extra Work or a Compensable Change for which Contractor is entitled to a Contract Adjustment. Compliance by Contractor with such direction shall not be interpreted as a waiver of Contractor's right to a Contract Adjustment if and to the extent that Contractor is entitled to a Contract Adjustment or Claim under the terms of the Contract Documents, including, without limitation, the right of Contractor to recover upon a Claim for the amount of any excess in the event that it is adjudged that the amount of the Contract Adjustment to which Contractor is entitled exceeds the limits of Public Contract Code §20142.

.2 WRITING OF ESSENCE. IT IS OF THE ESSENCE TO THE CONSTRUCTION CONTRACT BETWEEN CONTRACTOR AND COUNTY THAT ALL CHANGES MUST BE AUTHORIZED IN ADVANCE, IN WRITING, AS REQUIRED BY THIS ARTICLE 7. ACCORDINGLY, NO VERBAL DIRECTIONS, COURSE OF CONDUCT BETWEEN THE PARTIES, EXPRESS OR IMPLIED ACCEPTANCE OF CHANGES OR OF THE WORK, OR CLAIM THAT THE COUNTY HAS BEEN UNJUSTLY ENRICHED (WHETHER OR NOT THERE HAS BEEN SUCH ENRICHMENT) SHALL BE THE BASIS FOR A CONTRACT ADJUSTMENT IF CONTRACTOR HAS NOT OBTAINED ADVANCE WRITTEN AUTHORIZATION IN THE MANNER REQUIRED BY THIS ARTICLE 7.

### 7.3 CHANGE ORDERS

7.3.1 **Purpose.** The purpose of a Change Order is to establish the terms of the County's and Contractor's mutual agreement to a Contract Adjustment.

7.3.2 **Content.** A Change Order is a written instrument, prepared by the County, stating:

- .1 a Compensable Change or Deleted Work;
- .2 a Compensable Delay or Excusable Delay;
- .3 the amount of the Contract Adjustment, if any, to the Contract Price; and/or
- .4 the extent of the Contract Adjustment, if any, to the Contract Time.

### 7.4 UNILATERAL CHANGE ORDERS

7.4.1 **Purpose.** The purpose of a Unilateral Change Order is to establish the County's estimate of a disputed Contract Adjustment.

7.4.2 **Good Faith Determination.** The County's determination in a Unilateral Change Order of a Contract Adjustment shall be based upon a Good Faith Determination by County of the Contract Adjustment that is appropriate under the circumstances and consistent with the terms of the Contract Documents.

7.4.3 **Claim by Contractor.** If Contractor disputes any portion of the County's Good Faith Determination of a Contract Adjustment that is set forth in a Unilateral Change Order, Contractor shall file, within thirty (30) Days after issuance of the Unilateral Change Order by County, a Claim pursuant to Section 4.3, above. The amount of the Contract Adjustment requested in the Claim shall not exceed the difference between the amount (either in terms of dollar amount or number of Days) of the Contract Adjustment requested by Contractor and the amount (either in terms of dollar amount or number of Days) of the Contract Adjustment granted in the Unilateral Change Order. Contractor shall have no reserved right, and hereby waives any such right that may exist under Applicable Laws, to seek in such Claim a Contract Adjustment or recovery that is based upon any amount (either in terms of dollar amount or number of Days) that is in excess of such difference.

#### 7.4.4 WAIVER BY CONTRACTOR.

FAILURE BY CONTRACTOR TO SUBMIT A CLAIM PURSUANT TO SECTION 4.3, ABOVE, WITHIN THIRTY (30) DAYS AFTER ISSUANCE OF A UNILATERAL CHANGE ORDER BY COUNTY SHALL, IN ACCORDANCE WITH THE PROVISIONS OF SECTION 4.6 OF THE GENERAL CONDITIONS, CONSTITUTE A WAIVER BY CONTRACTOR OF THE RIGHT TO FURTHER RECOURSE OR RECOVERY BASED ON AN ASSERTION THAT THE AMOUNT OF THE CONTRACT ADJUSTMENT ON ACCOUNT OF THE CHANGE OR DELAY DESCRIBED IN SUCH UNILATERAL CHANGE ORDER SHOULD BE DIFFERENT THAN THE AMOUNT OF THE COUNTY'S GOOD FAITH DETERMINATION OF THE CONTRACT ADJUSTMENT AS SET FORTH IN SUCH UNILATERAL CHANGE ORDER.

## 7.5 CONSTRUCTION CHANGE DIRECTIVES

7.5.1 **Purpose.** The purpose of a Construction Change Directive is to: (1) direct the performance of a Change that does not involve a Contract Adjustment; (2) establish a mutually agreed basis for compensation to Contractor for a Compensable Change under circumstances where performance of the Compensable Change needs to proceed in advance of the County performing a full evaluation of the Contractor's rights relative to a Contract Adjustment; or (3) direct performance of Work or a Change with respect to which there exists a dispute or question regarding the terms of a Contract Adjustment.

7.5.2 **No Contract Adjustment.** A Construction Change Directive that directs the performance of Work or a Change that does not involve a Contract Adjustment to the Contract Price or Contract Time may be authorized by either the Director of Facilities Management or the County's project manager and shall be promptly performed by Contractor so as to not cause Delay to any other portion of the Work. A Construction Change Directive directing performance of a Change that does not contain any statement indicating that a Contract Adjustment is requested or required shall be conclusively presumed to be a Change that is not a Compensable Change and no Contract Adjustment increasing the Contract Price or Contract Time will be made on account thereof.

7.5.3 **Agreed Contract Adjustment.** A Construction Change Directive that contains a complete or partial agreement by the County and Contractor with respect to the Contractor's right to, or the amount of, a Contract Adjustment shall be authorized in accordance with, conform to the requirements of and be binding upon County and Contractor as provided for in, this Paragraph 7.5.3.

.1 **Complete Agreement.** Each Construction Change Directive involving a Compensable Change or Deleted Work with respect to which there is complete agreement on the terms of the Contract Adjustment shall comply with the following:

(1) **Statement of Agreement.** A statement shall be included that the County and Contractor are in agreement on all of the terms of the Contract Adjustment related to performance of such Compensable Change and set forth a full description of the terms of the Contract Adjustment, including, without limitation, its effect on the Contract Price and Contract Time.

(2) **Legal Effect.**

(a) **Upon Contractor.**

**THE AGREED TERMS OF THE CONTRACT ADJUSTMENT WITH RESPECT TO WHICH THERE IS A STATEMENT OF FULL AGREEMENT ON THE TERMS OF THE CONTRACT ADJUSTMENT FOR A CHANGE IN THE WORK SHALL BE FINAL AND BINDING UPON CONTRACTOR. ANY RIGHT OR CLAIM BY CONTRACTOR FOR ANY ADDITIONAL COMPENSATION OR EXTENSION OF TIME RELATING DIRECTLY OR INDIRECTLY TO SUCH CHANGE SHALL BE CONCLUSIVELY DEEMED WAIVED BY CONTRACTOR, EVEN IF THE CIRCUMSTANCES GIVING RISE TO SUCH ADDITIONAL COMPENSATION OR EXTENSION OF TIME WERE NOT SUSPECTED BY OR KNOWN TO THE CONTRACTOR AT THE TIME OF EXECUTION OF THE CONSTRUCTION CHANGE DIRECTIVE AND IF SUSPECTED OR KNOWN WOULD HAVE BEEN CONSIDERED BY CONTRACTOR TO HAVE BEEN MATERIAL TO CONTRACTOR'S AGREEMENT TO THE CONTRACT ADJUSTMENT SET FORTH IN THE CONSTRUCTION CHANGE DIRECTIVE.**

(b) **Upon County.** In recognition of the fact that Construction Change Directives may be issued under circumstances in which the County may not have had the access to pertinent information required for the County to fully evaluate the circumstances giving rise to the Change, it is agreed that neither the issuance nor execution of, nor any statement contained in, nor any course of conduct in connection with, a Construction Change Directive (including, without limitation, a Construction Change Directive that constitutes a full agreement by County and Contractor on the terms of a Contract Adjustment) shall be interpreted as a waiver, release or settlement of any of County's rights relating to the subject matter of the Construction Change Directive, or as creating or implying any right of Contractor to a Contract Adjustment, if it is found by County upon further investigation that circumstances existed, not known to County at the time of executing the Construction Change Directive, demonstrating that the Contractor was not in fact entitled to a Contract Adjustment or was entitled to a Contract Adjustment on different terms than those agreed to in the Construction Change Directive.

**.2 Partial Agreement.** Each Construction Change Directive involving a Compensable Change or Deleted Work with respect to which there is only agreement on a portion of the terms of a Contract Adjustment shall comply with the following:

**(1) Agreed Terms.** The Construction Change Directive shall state those terms of the Contract Adjustment as to which there is agreement.

**(a) Legal Effect.** Except to the extent of any additional open (i.e., non-agreed) terms stated or reserved in the Construction Change Directive, such agreement shall have the same legal effect set forth in Subparagraph 7.5.3.1 (2), above.

**(b) Time and Materials.** In the event that County and Contractor agree in the Construction Change Directive to the "time and materials" method of calculation set forth in Subparagraph 7.7.1.1 (4), below, but do not agree upon a maximum price, then the total cost to County for the Work covered by the Construction Change Directive shall under no circumstances exceed a price that is reasonable, competitive and fair to County given the amount and type of Work involved and the circumstances under which the Compensable Change is performed.

**(2) Open Terms.** The Construction Change Directive shall state those terms of the Contract Adjustment that are "open" or "disputed"; meaning those terms as to which the County and Contractor did not reach agreement.

**(a) ROM Estimate.** If such open terms involve the amount of the Contract Adjustment to the Contract Price or Contract Time on account of a Compensable Change, then the Construction Change Directive shall also include a Reasonable Order of Magnitude Estimate prepared by Contractor, or prepared by County and acknowledged in writing as accepted by Contractor, of the probable amount of the Contract Adjustment to the Contract Price and Contract Time associated with performance of the Compensable Change.

**(b) Legal Effect.** A Reasonable Order of Magnitude Estimate constitutes neither (i) a guarantee by Contractor that the amount of the Contract Adjustment to the Contract Price or Contract Time that may be associated with the Compensable Change or Deleted Work covered by such Construction Change Directive may not exceed the Reasonable Order of Magnitude Estimate nor (ii) authorization or agreement by County to a Contract Adjustment based on the amounts set forth in such Reasonable Order of Magnitude Estimate.

**(c) Time and Materials.** If County and Contractor state in the Construction Change Directive an agreement that the Contractor is entitled to a Contract Adjustment to the Contract Price on account of a Compensable Change, but do not state therein an agreement upon the method of calculation to be used for the Contract Adjustment from among the optional methods of calculation set forth in Paragraph 7.7.1, below, and if the County nonetheless directs Contractor to perform the Compensable Change pending future agreement on the amount of the Contract Adjustment, then it shall be conclusively presumed that County and Contractor have agreed that such Compensable Change shall be performed and compensated based upon the "time and materials" method of calculation set forth in Subparagraph 7.7.1.1 (4), below, and that the total Contract Adjustment for performance thereof shall under no circumstances exceed a price that is reasonable, competitive and fair to County given the amount and type of Work involved and the circumstances under which the Compensable Change is performed.

**7.5.4 Disputed Contract Adjustment.** Each Construction Change Directive involving a Contract Adjustment with respect to which there is a dispute or partial agreement shall, if Contractor is ordered to do so in a Construction Change Directive signed by the Director of Facilities Management, be performed by Contractor without Delay. Except as otherwise provided elsewhere in this Section 7.5, with respect to any open terms as to which the County and Contractor have not reached agreement both County and Contractor shall be deemed to have reserved their respective rights and defenses.

**7.5.5 Other Notices.** With respect to any Contract Adjustment or portion of a Contract Adjustment that is not fully resolved in a Construction Change Directive, neither issuance nor execution of such Construction Change Directive shall be interpreted as relieving Contractor of its obligation to comply with the requirements of these General Conditions relative to timely submission of notices required by the Contract Documents, including, without limitation, Notice of Change, Change Order Request, Notice of Delay or Request for Extension.



## 7.6 PROCEDURES

### 7.6.1 Notice of Change.

**.1 Submission.** Contractor shall submit a written Notice of Change to County if any instruction, request, drawing, specification, action, condition, omission, default or other circumstance occurs that constitutes a Compensable Change, Deleted Work, Compensable Delay or other matter that may involve or require a Contract Adjustment (additive or deductive). Such notice shall be provided prior to commencement of performance of the Work affected and no later than three (3) working days after the Discovery Date of such circumstance.

**.2 Form.** Notices of Change shall be provided using forms furnished by County or, if requested by County, using forms furnished by Contractor that are approved by County. Failure by County to request or approve a particular form shall not relieve Contractor of its obligation to provide a Notice of Change in a written form that complies with the requirements specified in Subparagraph 7.6.1.3, below.

**.3 Content.** Each Notice of Change in order to be considered complete shall include:

(1) a general statement of the circumstances giving rise to the Notice of Change (including, without limitation, identification of any related Construction Change Directive);

(2) a Reasonable Order of Magnitude Estimate by Contractor of any related Contract Adjustments (additive and deductive) to the Contract Price; and,

(3) if such circumstances involve a right to adjustment of the Contract Time due to Compensable Delay or Excusable Delay that has not been waived pursuant to Subparagraph 8.2.2.4, below, or Subparagraph 8.2.3.4, below, Contractor shall include, if not previously provided, a complete and timely Notice of Delay.

### **.4 WAIVER BY CONTRACTOR.**

**FAILURE BY CONTRACTOR TO PROVIDE A COMPLETE AND TIMELY NOTICE OF CHANGE UNDER CIRCUMSTANCES WHERE A NOTICE OF CHANGE INVOLVING A CHANGE IS REQUIRED BY THIS PARAGRAPH 7.6.1 SHALL, IN ACCORDANCE WITH THE PROVISIONS OF SECTION 4.6 OF THE GENERAL CONDITIONS, CONSTITUTE A WAIVER BY CONTRACTOR OF THE RIGHT TO A CONTRACT ADJUSTMENT ON ACCOUNT OF SUCH CIRCUMSTANCES AND A WAIVER OF ANY RIGHT TO FURTHER RECOURSE OR RECOVERY BY REASON OF OR RELATED TO SUCH CHANGE.**

**.5 Deductive Adjustments.** Failure by Contractor to submit a timely or proper Notice of Change under circumstances in which a Notice of Change is required shall in no way affect County's right to any deductive Contract Adjustment on account of such circumstances.

### 7.6.2 Change Order Request.

**.1 Submission.** With respect to any matter that may involve or require a Contract Adjustment (additive or deductive) of the Contract Price, Contractor shall, within fourteen (14) Days after receipt by the County of a Notice of Change pursuant to Paragraph 7.6.1, above, submit to the County a written Change Order Request.

**.2 Form.** Change Order Requests shall be provided using forms furnished by County or, if requested by County, using forms furnished by Contractor that are approved by County. Failure by County to request or approve a particular form shall not relieve Contractor of its obligation to provide a Change Order Request in a written form that complies with the requirements stated in Subparagraph 7.6.2.3, below.

**.3 Content.** Each Change Order Request in order to be considered complete shall include:

(1) a detailed description of the circumstances for the Compensable Change, Deleted Work or Compensable Delay;

(2) a complete, itemized cost breakdown (additive and deductive) of the Allowable Costs that form the basis for the Contractor's request for Contract Adjustment, including: (a) if the pricing is based on time and materials charges, all of Contractor's and each Subcontractor's Allowable Costs (including, without limitation, quantities, hours, unit prices, and rates) and Allowable Markups and (b) if the pricing is in the form of a lump sum price a detailed breakdown of the lump sum price into its component and individual items of Allowable Costs and Allowable Markup; and

(3) if such circumstances involve a right to a Contract Adjustment of the Contract Time due to Compensable Delay or Excusable Delay that has not been waived pursuant to Subparagraph 8.2.2.4, below, or Subparagraph 8.2.3.4, below, Contractor shall include, if not previously provided, a complete and timely Request for Extension.

#### **.4 WAIVER BY CONTRACTOR.**

**FAILURE BY CONTRACTOR TO PROVIDE A COMPLETE AND TIMELY CHANGE ORDER REQUEST UNDER CIRCUMSTANCES WHERE A CHANGE ORDER REQUEST INVOLVING A CHANGE IS REQUIRED BY THIS PARAGRAPH 7.6.2 SHALL, IN ACCORDANCE WITH THE PROVISIONS OF SECTION 4.6 OF THE GENERAL CONDITIONS, CONSTITUTE A WAIVER BY CONTRACTOR OF THE RIGHT TO A CONTRACT ADJUSTMENT ON ACCOUNT OF SUCH CIRCUMSTANCES AND A WAIVER OF ANY RIGHT TO FURTHER RECOURSE OR RECOVERY BY REASON OF OR RELATED TO SUCH CHANGE.**

**.5 Deductive Adjustments.** Failure by Contractor to submit a timely or proper Change Order Request under circumstances in which a Change Order Request is required shall in no way affect County's right to any deductive Contract Adjustment on account of such circumstances.

**7.6.3 Formal Notice of Essence.** Contractor recognizes and acknowledges that timely submission of a formal Notice of Change and Change Order Request, whether or not the circumstances of the Change may be known to the County or available to County through other means, is not a mere formality but is of crucial importance to the ability of County to promptly identify, prioritize, evaluate and mitigate the potential effects of Changes. Any form of informal notice, whether verbal or written (including, without limitation, statements in Requests for Information, statements at regular job meetings or entries on monthly reports, daily logs or job meeting minutes), that does not strictly comply with the formal requirements of Paragraph 7.6.1, above, and Paragraph 7.6.2, above, shall therefore be insufficient.

### **7.7 PRICING**

#### **7.7.1 Basis of Calculation.**

**.1 Changes Not Involving Time.** Contract Adjustments to the Contract Price on account of Compensable Changes or Deleted Work, other than Contract Adjustments to the Contract Price for Compensable Delay, shall be calculated according to one of the following methods:

(1) **Lump Sum.** By mutual acceptance of a lump sum proposal from Contractor based solely on Allowable Costs and Allowable Markups, that is properly itemized and supported by sufficient substantiating data to permit evaluation.

(2) **Unit Prices.** By the unit prices set forth in the Construction Contract or such other unit prices as are subsequently and mutually agreed to in writing between the County and Contractor, with no amount added thereto for Allowable Markups.

(3) **Estimating Guides.** For Compensable Changes with respect to which County elects to make a unilateral and final determination pursuant to Paragraph 7.7.11, below, by the sum of all the following:

(a) **Materials.** The reasonable value of materials and equipment documented as having been actually incorporated into the Work, which reasonable value may be less but shall never be more than Contractor's actual Allowable Costs therefor.

(b) **Labor.** An estimate of the reasonable costs of labor, installation and other services using the lower of the estimated prices for the locale of the Project (or if prices are not reported for the locale of the Project, the estimated prices that are reported for the region in which the Project is located) as reported in following recognized estimating guides: (i) R. S. Means Company, Inc. Building Construction Cost Data, Western Region - Latest Edition, P.O. Box 800 Kingston, MA 02364-800; or (ii) Lee Saylor, Inc. Current Construction Costs - Latest Edition, 9420 Topanga Canyon Boulevard, Woodland Hills, CA 91311.

(c) **Allowable Markup.** The amount that results when the applicable Allowable Markup is applied to the sum of the amounts derived from preceding Clauses (a) and (b) of this Subparagraph 7.7.1.1 (3).

(4) **Time and Materials.**

(a) **Compensable Changes.**

(i) **Contract Adjustment.** With respect to Compensable Changes, if none of the methods provided for in Subparagraphs 7.7.1.1 (1) through 7.7.1.1 (3), above, is applicable, then the additive amount increasing the Contract Price shall be calculated by taking (A) the total of the reasonable expenditures by Contractor and its Subcontractors, documented in the manner required by Paragraph 7.7.2, below, for Allowable Costs that are actually and directly incurred and paid in the performance of the Compensable Change, not to exceed for any Compensable Change a price that is reasonable, competitive and fair to County given the amount and type of Work involved and the circumstances under which the Compensable Change is performed, and (B) adding thereto the amount which results when the applicable Allowable Markups are applied to such total specified in preceding Clause (A) of this Subparagraph 7.7.1.1 (4) (a) (1).

(ii) **T & M/Guaranteed Maximums.** A Contract Adjustment that is calculated pursuant to this Subparagraph 7.7.1.1 (4) shall be subject to a not-to-exceed or guaranteed maximum price if such not-to-exceed or guaranteed maximum price has been mutually agreed upon between County and Contractor.

(iii) **Lump Sum Options.** If Contractor has reason to believe that a lump sum or unit price for a Subcontractor's performance of a portion of Extra Work authorized to be performed on a time and materials basis is available and Contractor has reason to believe such price is lower than the price that would be charged by the Subcontractor pursuant to the foregoing time and materials calculation, then Contractor has an obligation to inform County of that fact (along with the provision to the County of a complete itemized breakdown in accordance with Subparagraph 7.6.2.3(2), above) so as to afford County the opportunity, on a fully informed basis as to the component Allowable Costs and Allowable Markups that comprise such price, to avail itself of such favorable pricing.

(b) **Deleted Work.** With respect to Deleted Work (whether or not the Deleted Work involves a related Compensable Change as described in Paragraph 7.7.8, below), if none of the methods provided for in Subparagraphs 7.7.1.1 (1) through 7.7.1.1 (3), above, is applicable, then, in addition to the reduction, if any, that may be due to Owner pursuant to Subparagraph 8.2.6.2, below, (pertaining to Contract Adjustments shortening the Contract Time due to Deleted Work) and any additional reductions or credits to which County may be entitled under Paragraph 7.7.5, below, the Contract Price shall be reduced by the greater of either:

(i) the value assigned to the Deleted Work in the Schedule of Values attached to the Construction Contract, inclusive of all estimated markups by Contractor and any Subcontractor for overhead and profit set forth in the Schedule of Values (or, if insufficient detailed information on costs, overhead and profit for the Deleted Work is explicitly assigned in the Schedule of Values, as derived from the cost, bidding and/or estimating information that formed the basis for the establishment of the values set forth in such Schedule of Values); or

(ii) a reasonable estimate of the value of the Deleted Work (inclusive of all costs, overhead and profit) as of the date that the Construction Contract was executed by County and Contractor.

**.2 Changes Involving Time.** Contract Adjustments that are based on an extension of the Contract Time for Compensable Delay or a shortening of the Contract Time due to Deleted Work shall be calculated in the manner stated in the provisions of Section 3.3 of the Construction Contract and Article 8, below. Contract

Adjustments that are based on an acceleration in performance of the Work that is ordered by County in writing to overcome a Compensable Delay for which the Contractor is entitled to an extension of the Contract Time that has been properly requested and is not granted by County due to a County decision to accelerate rather than extend the Contract Time shall be calculated in the manner stated in the provisions of Article 8, below.

**7.7.2 Time and Materials Documentation.** Without limitation to any other provisions of the Contract Documents, Contractor's right to reimbursement of Allowable Costs incurred by Contractor or Subcontractors in the performance of a Compensable Change for which the Contract Adjustment is calculated pursuant to the time and materials method set forth in Subparagraph 7.7.1.1 (4), above, shall be conditioned on Contractor's compliance with the following conditions with respect to documentation of the Extra Work that is involved in the performance of the Compensable Change:

**.1 Labor.** At the close of each Day on which such Extra Work is performed, Contractor shall submit to County and, if requested, to the Inspector of Record, an Extra Work report, on forms provided by County, that sets forth with respect to each and all of the actual hours spent in performance of the Extra Work on the Day that the Extra Work was performed the following: the names of the workers, their classifications, hours worked and hourly rates. Such forms shall include a written certification by Contractor's project manager or superintendent at the time of submission that the information contained therein is complete and accurate.

**.2 Materials, Equipment.** At the close of each Day on which such Extra Work is performed, Contractor shall submit to County and, if requested, to the Inspector of Record, an Extra Work report, on forms provided by County, that sets forth with respect to each and all of the materials and equipment used or consumed in the performance of the Extra Work on the Day that the Extra Work was performed, the following: a list of the materials and equipment, prices or rates charged, in the case of equipment a description of the type of equipment, identification number, and hours of operation (including loading and transportation), and copies of delivery tickets, invoices or other documentation confirmatory of the foregoing.

**.3 Other Expenditures.** At the close of each Day on which such Extra Work is performed, Contractor shall submit to County and, if requested, to the Inspector of Record, an Extra Work report, on forms provided by County, that sets forth a list of other expenditures constituting Allowable Costs incurred in performance of the Extra Work on the Day that the Extra Work was performed, along with documentation verifying the amounts thereof in such detail as County may require.

**.4 Subsequent Documentation.** Documentation not available on any Day that a portion of the Extra Work is performed shall be submitted as soon as they are available but not later than twenty-one (21) Days after the earlier of the Day of delivery or incorporation of the particular item of Extra Work at the Site.

**.5 Subcontractor Costs.** Extra Work performed by Subcontractors on a time and materials basis shall be documented in the same manner as required of Contractor under this Paragraph 7.7.2. If Owner approves of a lump sum price for a Subcontractor's performance of Extra Work, then Contractor shall submit in lieu of the documentation otherwise required by this Subparagraph 7.7.2.5, such documentation as may be requested by Owner confirming the Extra Work performed on any given Day.

**.6 Authentication.** In addition to the foregoing, County may require that Contractor comply with other reasonable requirements pertaining to observation and verification of time and materials work and authentication of time and materials tickets and invoices by persons designated by County for such purpose.

**.7 WAIVER BY CONTRACTOR.**

**THE FAILURE OF CONTRACTOR TO SUBMIT AUTHENTICATION OF COSTS IN THE MANNER REQUIRED BY THIS PARAGRAPH 7.7.2 SHALL, IF COUNTY ELECTS IN ITS REASONABLE DISCRETION TO TREAT IT AS SUCH, CONSTITUTE A WAIVER BY CONTRACTOR OF ANY RIGHT TO A CONTRACT ADJUSTMENT FOR THE ALLOWABLE COSTS INCURRED FOR PERFORMANCE OF THAT PORTION OF THE EXTRA WORK FOR WHICH CONTRACTOR HAS FAILED TO PROVIDE SUCH AUTHENTICATION.**

**7.7.3 Allowable Costs.** The term "Allowable Costs" (1) means the costs that are listed in this Paragraph 7.7.3 and (2) excludes costs that do not constitute Allowable Costs under Paragraph 7.7.4, below:

**.1 Labor.** Straight-time wages and, if specifically authorized by County in writing, overtime wages for employees employed at the Site, including wages for employees of Subcontractors performing engineering or fabrication detailing at locations other than at the Site. The use of a labor classification which would increase the Allowable Costs for Extra Work will not be permitted unless Contractor establishes the necessity for the use of such labor classification. Overtime wages and salaries shall only constitute an Allowable Cost to the extent permitted by the Contract Documents and only as specifically authorized by County in writing setting forth the amount of overtime anticipated, which amount shall be deemed the maximum amount of overtime reimbursable as an Allowable Cost. As part of the Allowable Costs permitted by this Subparagraph 7.7.3.1, Contractor shall be entitled to be reimbursed wages paid to a "time and materials clerk" employed by Contractor to track and document Compensable Changes that are authorized or permitted to be performed on a time and materials basis pursuant to Subparagraph 7.7.1.1 (4), above, provided that the time expended by such employee is verified by contemporaneously maintained time sheets maintained by such clerk showing the actual time spent tracking and documenting the performance of Compensable Changes separately from other tasks or functions performed by such clerk.

**.2 Benefits.** To the extent based on wages reimbursable under Subparagraph 7.7.3.1, above, net actual employer costs of payroll taxes (FICA, Medicare, SUTA, FUTA), insurance (as adjusted for experience modifiers, premium discounts, dividends, rebates, expense constants, assigned risk pool costs, net cost reductions due to policies with deductibles for self-insured losses, assigned risk rebates, or the like), health and welfare, pension, vacation, apprenticeship funds and benefits required by lawful collective bargaining agreements.

**.3 Materials.** Costs of materials used or consumed in the Work. Such costs for Extra Work shall be at a price that is competitive to the price charged for similar materials delivered within the general vicinity of the Site by other subcontractors, suppliers, manufacturers and distributors. The cost for any such item that is not new shall mean "fair market value" based on the estimated price a reasonable purchaser would pay to purchase the used material at the time it was used or consumed for the Work, which fair market value must be declared by Contractor and approved by County prior to such use or consumption.

**.4 Taxes.** Sales taxes on the costs of the materials described in Subparagraph 7.7.3.3, above.

**.5 Equipment Rental.** Rental charges for necessary machinery and equipment, exclusive of hand tools, whether rented from Contractor or others. No charge shall be allowed or credit required for items which have a replacement value of One Hundred Dollars (\$100) or less. The allowable rental rates shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, loading, transportation, repairs and maintenance of any kind, depreciation, storage, insurance and all incidentals. If equipment used for Extra Work is used intermittently and, when not in use, could be returned to its rental source at less expense to County than holding it at the Site, it shall be returned, unless Contractor elects to keep it at the Site at no expense to County. Under no circumstances shall the aggregate rentals chargeable for any item of equipment exceed the following percentages of the fair market value of the item at the time of its first use for the Work, which fair market value must be declared by Contractor and approved by County prior to the first use of such item in or for the Work: (1) if the item is owned by the Contractor or any company affiliated with Contractor, the aggregate rentals shall not exceed 75% of such fair market value; and (2) if the item is not owned by the Contractor or any company affiliated with Contractor, the aggregate rentals shall not exceed 100% of such fair market value. All equipment shall be acceptable to County, in good working condition, and suitable for the purpose for which it is to be used. Manufacturer's ratings and manufacturer's approved modifications shall be used to classify equipment, and it shall be powered by a unit of at least the minimum rating recommended by the manufacturer. The cost of major repairs or overhauls of rented equipment or machinery shall be deemed a cost of business of the lessor of such equipment or machinery and shall not be reimbursable as an Allowable Cost.

**.6 Subcontractors.** Payments made by Contractor to Subcontractors; provided, however, that: (1) such payments are not otherwise precluded from reimbursement by the terms of the Contract Documents; (2) such payments are for Work performed in accordance with the requirements of the Contract Documents; (3) such payments are for amounts properly due and owing by Contractor under the terms of the governing contract between Contractor and such Subcontractor; and (4) in the case of payments for extra work performed by a Subcontractor pursuant to a change order executed between Contractor and a Subcontractor the change order was executed under circumstances in which the Subcontractor was entitled under the terms of its contract with Contractor to receive the amount of additional compensation agreed to in the change order.

**.7 Royalties, Permits.** Costs of royalties and permits.

**.8 Bonds.** Costs of bonds required to be furnished by Contractor (not Subcontractors) under the terms of the Contract Documents; provided, however, that such additional costs chargeable for Extra Work or credited for Deleted Work shall not exceed two percent (2%) of the costs described in Subparagraphs 7.7.3.1 through 7.7.3.7, above.

**7.7.4 Costs Not Allowed.** Allowable Costs shall not include any of the costs associated with any of the following (whether incurred by Contractor or a Subcontractor):

- .1** superintendent(s);
- .2** assistant superintendent(s);
- .3** project engineer(s);
- .4** project manager(s);
- .5** scheduler(s);
- .6** estimator(s);
- .7** drafting or detailing (except as otherwise permitted by Paragraph 7.7.3.1, above)
- .8** vehicles not dedicated solely to the performance of the Work;
- .9** small tools with a replacement value not exceeding One Hundred Dollars (\$100);
- .10** office expenses, including staff, materials and supplies;
- .11** on-Site and off-Site trailer and storage rental and expenses;
- .12** Site fencing not added solely due to the performance of Extra Work;
- .13** utilities, including gas, electric, sewer, water, telephone, telefax and copier equipment;
- .14** computer and data-processing personnel, equipment and software;
- .15** federal, state or local business, income and franchise taxes;
- .16** insurance (including, without limitation, general liability, automobile and worker's compensation);
- .17** without limitation to Contractor's right to liquidated damages under Section 3.3 of the Construction Contract, Losses, of any kind, incurred by Contractor or a Subcontractor, of any Tier, that arise from or relate to Delay (including Excusable Delay, Compensable Delay or Unexcused Delay) or acceleration to overcome the effects of such Delay; and
- .18** costs and expenses of any kind or item not specifically and expressly included in Paragraph 7.7.3, above.

**7.7.5 Allowable Markups.** Allowable Markups consist of the percentages set forth provided for by this Paragraph 7.7.5. Allowable Markups are deemed to cover, without limitation, the following: (1) direct and indirect overhead (including, without limitation, consumables, small tools and cleanup) and profit of the Contractor; (2) direct and indirect overhead (including, without limitation, consumables, small tools and cleanup) and profit of the Subcontractors, of every Tier; and (3) all costs that are not reimbursable to Contractor under Paragraph 7.7.4, above. Subject to the exclusions and limitations set forth in Paragraph 7.7.7, below, or elsewhere in the Contract Documents, Allowable Markups include and are limited to the following:

**.1 Self-Performed Work**

(1) **Compensable Change.** With respect to all or that portion of a Compensable Change involving Self-Performed Work, the Allowable Markup to Contractor shall be not more than five percent (5%), which percentage shall for purposes of calculating the Contract Adjustment be multiplied times the Allowable Costs incurred by Contractor in the performance thereof, including, without limitation, Allowable Costs for materials or equipment purchased by Contractor from a first-Tier Subcontractor that is not an Installation Subcontractor.

(2) **Deleted Work.** With respect to all or that portion of Deleted Work involving Self-Performed Work, County shall be entitled to a credit equal to five percent (5%) of the amount of the credit for the savings to Contractor for the Self-Performed Work as calculated pursuant to Subparagraph 7.7.1.1 (4), (b), above.

**.2 Installation Subcontractors (First-Tier)**

(1) **Compensable Change.** With respect to all or that portion of a Compensable Change that is performed by a first-Tier Installation Subcontractor, the Allowable Markups to the first-Tier Installation Subcontractor and the Contractor shall be as follows:

(a) The Allowable Markup to the first-Tier Installation Subcontractor shall be not more than fifteen percent (15%), which percentage shall for purposes of calculating the Contract Adjustment be multiplied times the Allowable Costs incurred by such first-Tier Installation Subcontractor in the performance of such Compensable Change.

(b) The Allowable Markup to Contractor shall be five percent (5%), which percentage shall for purposes of calculating the Contract Adjustment be multiplied times the sum of (i) the Allowable Costs incurred by such first-Tier Subcontractor in the performance of such Compensable Change and (ii) the amount which results when the Allowable Markups thereon that are permitted pursuant to preceding Clause (a) of this Subparagraph 7.7.5.2 (1) are multiplied times such Allowable Costs.

(2) **Deleted Work.** With respect to all or that portion of Deleted Work that was to have been performed by a first-Tier Installation Subcontractor, the Contract Price shall be reduced as provided in Subparagraph 7.7.1.1 (4), (b), above. In addition, a credit shall be due from Contractor of five percent (5%) of the amount of the total credit due pursuant to Subparagraph 7.7.1.1 (4), (b), above.

**.3 Installation Subcontractors (Second-Tier)**

(1) **Compensable Change.** With respect to all or that portion of a Compensable Change that is performed by a second-Tier Installation Subcontractor, the Allowable Markups to such second-Tier Installation Subcontractor, to the first-Tier Installation Subcontractor that is above and in the same vertical contractual line of Tiers with such second-Tier Installation Subcontractor and to the Contractor, shall be as follows:

(a) The Allowable Markup to the second-Tier Installation Subcontractor shall be not more than five percent (5%), which percentage shall for purposes of calculating the Contract Adjustment be multiplied times the Allowable Costs incurred by such second-Tier Installation Subcontractor in the performance of such Compensable Change.

(b) The Allowable Markup to the first-Tier Installation Subcontractor that is above and in the same vertical contractual line of Tiers with such second-Tier Installation Subcontractor shall be not more than fifteen percent (15%), which percentage shall for purposes of calculating the Contract Adjustment be multiplied times the sum of (i) the Allowable Costs incurred by such second-Tier Installation Subcontractor in the performance of such Compensable Change and (ii) the amount which results when the Allowable Markups thereon pursuant to preceding Clause (a) of this Subparagraph 7.7.5.3 (1) are multiplied times such Allowable Costs.

(c) The Allowable Markup to Contractor shall be five percent (5%), which percentage shall for purposes of calculating the Contract Adjustment be multiplied times the sum of (i) the Allowable Costs incurred by the second-Tier Installation Subcontractor in the performance of such Compensable Change and (ii)

the amounts which result when the Allowable Markups thereon that are permitted pursuant to Clauses (a) and (b) of this Subparagraph 7.7.5.3 (1) are multiplied times such Allowable Costs.

(2) **Deleted Work.** With respect to all or that portion of Deleted Work that was to have been performed by a second-Tier Installation Subcontractor, the Contract Price shall be reduced as provided in Subparagraph 7.7.1.1 (4), (b), above. In addition, a credit shall be due from Contractor of five percent (5%) of the amount of the total credit due pursuant to Subparagraph 7.7.1.1 (4), (b), above.

**.4 Other Subcontractors.**

(1) **Compensable Changes:** With respect to any other Subcontractor, of any Tier, performing all or a portion of a Compensable Change who is not an Installation Subcontractor or who is an Installation Subcontractor below the second-Tier, the following shall apply:

(a) No markup shall be allowed to such other Subcontractor.

(b) The Subcontractor that is positioned in the Tier immediately above such other Subcontractor shall be entitled to an Allowable Markup of not more than five percent (5%) upon the Allowable Costs incurred by such other Subcontractor in the performance thereof.

(c) No other Allowable Markup by any Subcontractor of any Tier above such other Subcontractor shall be permitted.

(d) Contractor shall be entitled to an Allowable Markup of five percent (5%) of the sum of (i) the Allowable Costs of such other Subcontractor incurred in the performance of such Compensable Change and (ii) the amount which results when the Allowable Markup permitted by Clause (b) of this Subparagraph 7.7.5.4 (1) is multiplied times such Allowable Costs.

(2) **Deleted Work.** With respect to all or that portion of Deleted Work that was to have been performed by such other Subcontractor who is not an Installation Subcontractor or who is an Installation Subcontractor below the second-Tier, the Contract Price shall be reduced as provided in Subparagraph 7.7.1.1 (4), (b), above. In addition, a credit shall be due from Contractor of five percent (5%) of the amount of the total credit due pursuant to Subparagraph 7.7.1.1 (4), (b), above.

7.7.6 **Review of Markups.** It is Contractor's responsibility to review information submitted by Subcontractors to ensure that all markups comply with the requirements of the Contract Documents. Payment by the County of markups that exceed Allowable Markups shall not be considered as a waiver by County of the right to require repayment by Contractor of any markup charged that is in excess of Allowable Markups and such excess amounts shall be promptly paid by Contractor to County.

7.7.7 **Exclusions and Limitations.** Allowable Markups are not permitted:

.1 on agreed unit prices;

.2 on materials, products or equipment furnished by County;

.3 on liquidated damages payable to Contractor pursuant to Section 3.3 of the Construction Contract for Compensable Delay;

.4 to a Subcontractor who contracts to perform a Compensable Change that is in fact wholly performed by another Subcontractor (for purposes of this Paragraph 7.7.7, "wholly performed" means that all of the Compensable Change, other than supervision or minor labor or materials, are furnished by such other Subcontractor); or

.5 on any cost or compensation with respect to which the Contract Documents state that there shall be "no Allowable Markup", "no markup for overhead and profit" or words of similar meaning.



**7.7.8 Net Calculations.** If any one Change or collection of Changes in the same or related portions of the Work, or in multiple portions of Work covered by a single bulletin or instruction by County, involve both Compensable Change and Deleted Work, and if the added Allowable Costs resulting from the Compensable Change exceed the reduction calculated in accordance with Subparagraph 7.7.1.1 (4), (b), above, (excluding any Allowable Markup to the Contractor) then the calculation of Allowable Markups to Contractor shall be based on and limited to the resulting net increase in the Allowable Costs.

**7.7.9 Unit Prices.** Unless otherwise stated in the Contract Documents, unit prices stated in the Contract Documents or subsequently agreed upon by County and Contractor shall be deemed to include and encompass all costs of performance, overhead and profit, including, without limitation, all Allowable Costs and Allowable Markups. If the unit price stated in the Contract Documents is based on an estimated quantity established by County in the Construction Contract and the actual quantity of such unit-priced item varies by more than 25% above or below the estimated quantity, an equitable adjustment in the Contract Price shall be made upon demand of either County or Contractor. Such equitable adjustment shall be based solely upon any increase or decrease in Allowable Costs (without any Allowable Markups), due solely to the variation above 125% or below 75% of the estimated quantity.

**7.7.10 Discounts.** For purposes of determining Allowable Costs of a Compensable Change, all trade discounts, rebates, refunds, and returns from the sale of surplus materials and equipment shall accrue and be credited to County, and Contractor shall take all necessary steps to ensure that such discounts, rebates, refunds, and returns are secured.

**7.7.11 Prompt Pricing.** It is fundamental to the County's objective of controlling costs that performance of Compensable Changes on a time and materials basis of compensation and without a not-to-exceed price be curtailed. Contractor recognizes that prompt pricing by Contractor is critical to this objective. Accordingly, in addition to and without limitation on any of the County's other rights or remedies, including, without limitation, its right to enforce a waiver under Subparagraph 7.6.2.4, above, it is agreed that if Contractor fails to timely submit a complete Change Order Request in accordance with Paragraph 7.6.2, above, with respect to any circumstance, event or occurrence constituting a Compensable Change then: (1) any Delay to the performance of the Work associated with the performance, delayed performance or nonperformance of such Compensable Change shall be conclusively deemed to be an Unexcused Delay; and (2) the County shall have the option, exercised in its sole discretion, to unilaterally fix and determine the amount of the Contract Adjustment to the Contract Price for such Compensable Change based on the "estimating guide" method set forth in Subparagraph 7.7.1.1 (3), above, which determination shall be conclusively final and binding upon Contractor.

**7.7.12 Final Payment.** No Claim by Contractor for a Contract Adjustment shall be allowed if asserted after Final Payment.

**7.7.13 Full Resolution.** Except as otherwise stated in Paragraph 7.7.14, below, the signing of a Change Order by Contractor and the County shall be conclusively deemed to be a full resolution, settlement and accord and satisfaction with respect to any and all Loss and Delay, whether known or unknown at the time of execution of the Change Order, related to the subject matter of the Change Order, including, without limitation, all rights to recovery of costs, expenses or damages for delay, disruption, hindrance, interference, extended or extraordinary (direct and indirect) overhead, multiplicity of changes, loss of productivity, labor, wage or material cost escalations, inefficiency, legal expenses, consultant costs, interest, lost profits or revenue, bond and insurance costs, changes in taxes and other similar and related Losses. The foregoing provisions of this Paragraph 7.7.13 shall, whether or not they are expressly stated or referenced on the face of a Change Order, be deemed to be part of the terms of the Change Order and shall be deemed to supersede and govern over any other provision contained in any proposal, estimate or other documents attached to or referenced in such Change Order that conflicts with the provisions of this Paragraph 7.7.13. **ANY RIGHT OR CLAIM BY CONTRACTOR FOR ANY ADDITIONAL COMPENSATION OR EXTENSION OF TIME RELATING DIRECTLY OR INDIRECTLY TO A COMPENSABLE CHANGE DESCRIBED IN A FULLY EXECUTED CHANGE ORDER SHALL BE CONCLUSIVELY DEEMED WAIVED BY CONTRACTOR, EVEN IF THE CIRCUMSTANCES GIVING RISE TO SUCH ADDITIONAL COMPENSATION OR EXTENSION OF TIME WERE NOT SUSPECTED BY OR KNOWN TO THE CONTRACTOR AT THE TIME OF EXECUTION OF THE CONSTRUCTION CHANGE DIRECTIVE AND IF SUSPECTED OR KNOWN WOULD HAVE BEEN CONSIDERED BY CONTRACTOR TO HAVE BEEN MATERIAL TO CONTRACTOR'S AGREEMENT TO THE CONTRACT ADJUSTMENT SET FORTH IN THE CHANGE ORDER.**

**7.7.14 Reserved Rights.** Change Orders shall be executed by Contractor without any express reservation of rights by Contractor to reserve for the future the assertion of any right of recovery from the County for Loss or Delay arising out of or relating to the subject matter of the Change Order. Execution of a Change Order, Unilateral Change Order or Construction Change Directive shall not be interpreted as a waiver, release or settlement of any rights or claims that the County may have for any of the following: (1) Defective Work; (2) liquidated damages or actual Losses for Delay; or (3) recoupment by County (by way of withholding of funds, set off or recovery from Contractor) of amounts paid by County for costs or markups on costs that the County discovers, following payment of such amounts to Contractor, do not constitute proper charges to County, or that constitute charges that are not properly substantiated, under the terms of the Contract Documents.

**7.7.15 No "Total Cost" Calculations.** Contractor represents and warrants that it has the ability to generate and maintain complete and accurate cost accounting records that, if required, will reflect the actual costs of the Work incurred or avoided for multiple Compensable Changes and, on an event-by-event basis, the effect of multiple and concurrently occurring or caused Compensable Delays on the progress of the Work. Accordingly, Contractor agrees that all Change Order Requests and Claims shall be itemized in a manner that, with reasonable mathematical certainty and without reliance upon probabilities or inferences, segregates on a discrete, event-by-event basis the direct, actual Allowable Costs associated with each individual Compensable Change or Compensable Delay. Unless otherwise agreed to by County in writing in the exercise of its sole discretion, Change Order Requests and Claims shall not be based, in whole or in part, upon any methodology (such as "total cost" or "modified total cost" methodologies) that purports to establish Contractor's entitlement to additional compensation inferentially based, solely or principally, on the difference between Contractor's total costs for the Work or a portion of the Work and its original Bid.

**7.7.16 Multiple Changes.** The County reserves the absolute right to make whatever Changes, including, without limitation, Compensable Changes or Deleted Work, that it determines, in its sole discretion, are necessary or otherwise desirable. Under no circumstances shall the individual or cumulative number, value or scope of such Changes, or their individual and cumulative impact on the Work, become a basis for Contractor to assert any claim for breach of contract, abandonment, rescission, termination, cardinal change or reformation of the Construction Contract, nor shall such circumstances be the basis for Contractor, or any of the Subcontractors, of any Tier, to assert a right of recovery of any Loss if such right is not permitted by, or is in excess of that allowed under, the Contract Documents.

**7.7.17 Continuous Performance.** Subject to Contractor's rights under Section 15.4, below, no dispute or disagreement with respect to any Changes or Delay, including, without limitation, disputes over Contractor's right to or the terms of a Contract Adjustment, shall relieve or excuse Contractor from the obligation to proceed with and maintain continuous, expeditious and uninterrupted performance of the Work, including performance of any disputed Changes.

## **ARTICLE 8 CONTRACT TIME**

### **8.1 COMMENCEMENT AND COMPLETION**

**8.1.1 Date of Commencement.** The Date of Commencement shall not be postponed by the failure of Contractor or of persons or entities for whom Contractor is responsible to perform an obligation. Contractor shall not knowingly, except by agreement or instruction of the County in writing, commence operations on the Site or elsewhere prior to receipt of a Notice to Proceed. Contractor shall not commence any Work at the Site prior to its obtaining the insurance required by Article 11, below, and the Performance Bond and Payment Bond required by Article 12, below, and the Date of Commencement of the Work shall not be changed by the effective date of such insurance or bonds.

**8.1.2 Substantial, Final Completion.** Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion and Final Completion within the Contract Time, as adjusted for extensions of time duly permitted, authorized and noticed pursuant to Section 8.2, below.

**8.1.3 Adjustments to Contract Time.** Subject to the limitations set forth in this Article 8 and elsewhere in the Contract Documents, the Contract Time shall be extended for Compensable Delays and Excusable Delays and shall, where appropriate, be shortened for Deleted Work.

**8.1.4 Early Completion.** Nothing stated in these General Conditions or elsewhere in the Contract Documents shall be interpreted as creating any contractual right, express or implied, on the part of Contractor to finish

the Work earlier than the Contract Time. Contractor has included in its Contract Price the costs of all Contractor's and its Subcontractors' direct and indirect overhead, including but not limited to all staff, temporary facilities, temporary utilities and home office overhead for the entire duration of the Contract Time. These costs have been included in the Contract Price notwithstanding Contractor's anticipation of possibly completing the Work in fewer Days than established by the Contract Time. Under no circumstances (including, without limitation, circumstances in which the County has approved in writing of Contractor completing early) shall the County be liable to Contractor for any Losses, of any kind, due to the inability of Contractor to complete the Work earlier than the Contract Time, regardless of the cause, including, without limitation, Delays due to acts or omissions (intentional or negligent) of the County, Inspectors of Record, County Consultants, Separate Contractors or others. If the Contractor anticipates completing early, it must obtain in advance County's approval in writing of such early completion. Approval by County of such early completion may be granted or withheld in the County's sole and absolute discretion.

## 8.2 DELAYS AND EXTENSIONS OF TIME

### 8.2.1 Adjustments to Contract Time

.1 **Extensions.** Provided that Contractor has complied with the provisions of this Section 8.2 (including, without limitation, the requirements pertaining to timely delivery of a Notice of Delay and Request for Extension), if, as a result of Excusable Delay or Compensable Delay to the actual, as-built critical path of activities leading to achievement of Substantial Completion, Contractor is unable to achieve Substantial Completion within the Contract Time for Substantial Completion, then the Contract Time for Substantial Completion and Final Completion shall be extended, either by Change Order or Unilateral Change Order, for the length of the proven, resulting Delay to Contractor's ability to so complete the Work. The Contract Time shall not be adjusted for Unexcused Delays.

.2 **Shortening.** Contractor shall within ten (10) Days after receiving notice of Deleted Work prepare and deliver to County a Time Impact Analysis of the impact of the Deleted Work upon the critical path to determine if the Contract Time should be shortened thereby and if so the duration of the shortening. If the County and Contractor are unable to agree upon the duration of the shortening, then County shall make a Good Faith Determination of the reasonable amount of time that the Contract Time shall be shortened on account of such Deleted Work.

### .3 Prescribed Calculations.

(1) **Work Day Lost Calculations.** Contractor may claim an Excusable Delay or a Compensable Delay for a full Day only if all Work on a critical path activity is stopped for more than six (6) hours of a normal eight (8) hour Work Day and for a half-Day only if all Work on a critical path activity is stopped for three (3) to six (6) hours of such a normal Work Day. No Excusable Delay or Compensable Delay may be claimed if all Work on a critical path activity is stopped for less than three (3) hours of such a normal work Day. Similarly, where Deleted Work results in the projected avoidance of the need to perform more than six (6), or between three (3) and six (6) hours of all Work on a critical path activity on such a normal work day, the Contract Time shall be contracted by a full Day or half Day, respectively.

(2) **Dry Out Time Calculations.** Contract Adjustments to the Contract Time that are based upon unusual precipitation that is an Act of God as defined in Paragraph 1.1.2, above, shall include, in addition to the number of Days of Excusable Delay to which Contractor is entitled due to a cessation of Work that occurs at the Site while the unusual precipitation is occurring, an additional extension for the Delay to the critical path of activities affecting Substantial Completion that is the result of Contractor being unable, after cessation of the unusual precipitation at the Site, to proceed with performance of Work due to wet or muddy conditions at the Site (hereinafter referred to as "dry out" time); provided, however, that the amount of dry out time for which Contractor is entitled to an extension of time in any given calendar month shall not exceed the number of Days that is the product derived by multiplying (a) the number of Days of Excusable Delay to which Contractor is entitled due to a cessation of Work that occurs at the Site while such unusual precipitation is occurring, by (b) a fraction, the (i) numerator of which is the number of Days of Excusable Delay due to measurable unusual precipitation occurring at the Site during such calendar month that constitutes an Act of God as defined in Paragraph 1.1.2, above, and (ii) the denominator of which is the total number of Days of measurable precipitation occurring at the Site during said calendar month (including both the number of Days comprising the normal, 10-year monthly average of measurable precipitation recorded by NOAA and the excess, or unusual precipitation that constitutes an Act of God as defined in Paragraph 1.1.2, above).

## 8.2.2 Notice of Delay.

**.1 Submission.** Contractor shall submit written Notice of Delay to County if any instruction, request, drawing, specification, action, condition, omission, default or other circumstance occurs that constitutes an Excusable Delay or Compensable Delay or other matter that may involve or require a Contract Adjustment extending the Contract Time. Such notice shall be provided prior to performance of the Work affected or involved and no later than seven (7) Days after the Discovery Date of such circumstance.

**.2 Form.** Notices of Delay shall be provided using forms furnished by County or, if requested by County, using forms furnished by Contractor that are approved by County. Failure by County to request or approve a particular form shall not relieve Contractor of its obligation to provide Notice of Delay in a written form that complies with the requirements of this Paragraph 8.2.2.

**.3 Content.** Each Notice of Delay in order to be considered complete shall include:

(1) a general statement of the circumstances giving rise to the Notice of Delay (including, without limitation, identification of any related Construction Change Directive);

(2) a Reasonable Order of Magnitude Estimate by Contractor of any related Contract Adjustments extending the Contract Time; and

(3) if such circumstances involve a right to a Contract Adjustment to the Contract Price for Compensable Change that has not been waived by Contractor, Contractor shall include, if not previously provided, a complete and timely Notice of Change.

## **.4 WAIVER BY CONTRACTOR.**

**FAILURE BY CONTRACTOR TO PROVIDE A COMPLETE AND TIMELY NOTICE OF DELAY UNDER CIRCUMSTANCES WHERE A NOTICE OF DELAY INVOLVING A DELAY IS REQUIRED BY THIS PARAGRAPH 8.2.2 SHALL, IN ACCORDANCE WITH THE PROVISIONS OF SECTION 4.6 OF THE GENERAL CONDITIONS, CONSTITUTE A WAIVER BY CONTRACTOR OF THE RIGHT TO A CONTRACT ADJUSTMENT ON ACCOUNT OF SUCH CIRCUMSTANCES AND A WAIVER OF ANY RIGHT TO FURTHER RECOURSE OR RECOVERY BY REASON OF OR RELATED TO SUCH DELAY.**

**.5 No County Notice.** Failure by Contractor to submit a timely or proper Notice of Delay under circumstances in which a Notice of Delay is required shall in no way affect County's right to a Contract Adjustment shortening the Contract Time on account of such circumstances.

## 8.2.3 Request for Extension.

**.1 Submission.** With respect to any matter that may involve or require an adjustment extending the Contract Time, Contractor shall, within fourteen (14) Days after receipt by County of a Notice of Delay pursuant to Paragraph 8.2.2, above, submit to County a written Request for Extension.

**.2 Form.** Requests for Extension shall be provided using forms furnished by County or, if requested by County, using forms furnished by Contractor that are approved by County. Failure by County to request or approve a particular form shall not relieve Contractor of its obligation to provide Requests for Extension in a written form that complies with the requirements of this Paragraph 8.2.3.

**.3 Content.** Each Request for Extension in order to be considered complete shall include:

(1) a detailed description of the circumstances giving rise to the request for Contract Adjustment to the Contract Time and a Time Impact Analysis (a Request for Extension that seeks an extension for more than one Delay shall be supported by a separate Time Impact Analysis for each separate Delay); and

(2) if such circumstances involve a right to a Contract Adjustment of the Contract Price on account of Compensable Change that has not been waived by Contractor, Contractor shall include, if not previously provided, a complete and timely Change Order Request.

#### **.4 WAIVER BY CONTRACTOR.**

**FAILURE BY CONTRACTOR TO PROVIDE A COMPLETE AND TIMELY REQUEST FOR EXTENSION UNDER CIRCUMSTANCES WHERE A REQUEST FOR EXTENSION INVOLVING A DELAY IS REQUIRED BY THIS PARAGRAPH 8.2.3 SHALL, IN ACCORDANCE WITH THE PROVISIONS OF SECTION 4.6 OF THE GENERAL CONDITIONS, CONSTITUTE A WAIVER BY CONTRACTOR OF THE RIGHT TO A CONTRACT ADJUSTMENT ON ACCOUNT OF SUCH CIRCUMSTANCES AND A WAIVER OF ANY RIGHT TO FURTHER RECOURSE OR RECOVERY BY REASON OF OR RELATED TO SUCH DELAY.**

**.5 Adjustments Shortening Time.** Failure by Contractor to submit a timely or proper Request for Extension under circumstances in which a Request for Extension is required shall in no way affect County's right to a Contract Adjustment shortening the Contract Time on account of such circumstances.

**8.2.4 Response by County.** After receipt of a timely and complete Request for Extension, County shall investigate the facts concerning the cause and extent of such Delay and, depending on whether the Request for Extension is justified, will notify Contractor of its approval or disapproval of all or a portion of Contractor's request. Extensions of time approved by County shall apply only to that portion of the Work affected by the Delay, and shall not apply to other portions of Work not so affected.

**8.2.5 Formal Notice of Essence.** Contractor recognizes and acknowledges that timely submission of a formal Notice of Delay and a formal Request for Extension, whether or not the circumstances of a Delay may be known to County or available to County through other means, are not mere formalities but are of crucial importance to the ability of County to promptly identify, prioritize, evaluate and mitigate the potential effects of Delay. Any forms of informal notice, whether verbal or written (including, without limitation, statements at regular job meetings or entries in monthly reports, daily logs, job meeting minutes, updated Construction Schedules or look-ahead schedules), that do not strictly comply with the formal requirements of Paragraph 8.2.2, above, and Paragraph 8.2.3, above, shall accordingly be deemed insufficient to satisfy the notice requirements of this Article 8.

#### **8.2.6 Compensation for Delay.**

**.1 Compensable Delay.** Contract Adjustments to the Contract Price for a Compensable Delay that involve an extension of the Contract Time shall be based, without duplication to any other Contract Adjustments to the Contract Price, on the terms of Section 3.3 of the Construction Contract. Contractor agrees to accept such right of Contract Adjustment in lieu of any other right that may exist under Applicable Laws for recovery of Losses due to Compensable Delay, whether incurred by Contractor or its Subcontractors, of any Tier.

**.2 Deleted Work.** The Contract Time and Contract Price shall be reduced by Contract Adjustment for Deleted Work (including, without limitation, Deleted Work associated with a termination by County of a portion of the Construction Contract or a deletion of portion of Work for the convenience of the County or due to an Event of Contractor Default) that results in a shortening of the Contract Time.

**(1) Contract Time.** The Contract Adjustment shortening the Contract Time for Substantial Completion shall be the number of Days that Contractor at the time of contracting would have reasonably expected to expend in performance of the Deleted Work and that, based on the Contractor's original Construction Schedule prepared on or about the time of contracting, were reasonably expected by Contractor to be critical to Substantial Completion of the Work within the Contract Time for Substantial Completion.

**(2) Contract Price.** The Contract Adjustment reducing the Contract Price shall be the product of (1) the number of Days that the Contract Time for Substantial Completion is shortened pursuant to preceding Clause (1) of this Subparagraph 8.2.6.2 multiplied times (2) the amount of liquidated damages set forth in Paragraph 3.3.2 of the Construction Contract, without any additional credit to County for Allowable Markups.

#### **8.2.7 Acceleration of the Work.**

**.1 Due to Unexcused Delay.** If County makes a Good Faith Determination based on County's observations of progress in performance of the Work by Contractor that Contractor will not achieve Substantial Completion of the Work within the Contract Time as adjusted pursuant to Paragraph 8.2.1, above, then Contractor shall, following receipt of a written request by County to accelerate, immediately respond in writing setting forth a detailed plan for accelerating the Work. All measures necessary, including working overtime, additional shifts, Saturdays, Sundays and holidays, to accelerate performance to ensure that the Work is performed within the Contract Time shall be taken by Contractor and the cost thereof shall be paid for by Contractor at Contractor's Own Expense. County may also take all other necessary measures to ensure no further Delays affect achievement of Substantial Completion and Final Completion of the Work within the Contract Time and the Contractor shall reimburse County, or County may withhold from payment due to Contractor, for Losses incurred by County in taking such measures.

**.2 Due to Excusable Delay.** Contractor shall have the right, exercised in its sole discretion, to accelerate performance of the Work to overcome time lost due to Excusable Delay. Such acceleration, if performed other than at the written direction of County, shall be deemed a voluntary acceleration and the cost of such accelerated performance shall be paid for by Contractor at Contractor's Own Expense. If County directs in writing that the Work be accelerated to overcome an Excusable Delay that is not concurrent with an Unexcused Delay, then Contractor shall be entitled to a Contract Adjustment to the Contract Price for such acceleration on and subject to the same terms as provided for in Subparagraph 8.2.7.3, below, in the case of an acceleration to overcome a Compensable Delay.

**.3 Due to Compensable Delay.** County shall have the right, exercised in its sole and absolute discretion, in lieu of granting a Contract Adjustment to the Contract Time for Compensable Delay, to direct in writing the acceleration of the Work by Contractor in order to recapture time lost due to such Compensable Delay. County and Contractor shall endeavor prior to commencement of such acceleration to mutually agree upon the amount of compensation to be paid therefor. County shall have the right, in the absence of such an agreement, to direct in writing that Contractor accelerate. Contractor shall comply with such directive. Contractor's right to a Contract Adjustment to the Contract Price on account of such acceleration shall be limited to (1) the premium time portion of any overtime paid for labor provided by Contractor or any Subcontractor, plus (2) additional supervision costs for additional shifts of supervision provided at the Site by Contractor only (not by Subcontractors), plus (3) Allowable Markup thereon as provided in Paragraph 7.7.5, above. Except as directed by County in the manner stated in this Subparagraph 8.2.7.3, no statements, conduct or actions by County will be construed as creating an obligation on the part of County to agree to a Contract Adjustment to the Contract Price on account of any cost of overtime or other costs associated with an acceleration of the Work to recapture time lost due to Compensable Delay.

**8.2.8 Concurrent Delays.** For purposes of the calculations provided for in this Paragraph 8.2.8, the words "concurrent delay", "concurrently delay" or "occur concurrently" mean the portion of two or more Delays affecting the critical path to Substantial Completion that are overlapping or co-existent. Contractor's right to a Contract Adjustment of the Contract Time (pursuant to Subparagraphs 8.2.8.1, 8.2.8.2 and 8.2.8.3, below) and Contract Price (pursuant to Subparagraphs 8.2.8.4, 8.2.8.5 and 8.2.8.6, below) shall, in the case of concurrent delays, be calculated in accordance with the following:

**.1** If an Excusable Delay and a Compensable Delay occur concurrently, the maximum extension of the Contract Time shall be the number of Days from the commencement of the first Delay to the cessation of the Delay which ends last.

**.2** If an Unexcused Delay occurs concurrently with either an Excusable Delay or a Compensable Delay, the maximum extension of the Contract Time shall be the number of Days, if any, by which such Excusable Delay or Compensable Delay exceeds the number of Days of such Unexcused Delay.

**.3** If an Unexcused Delay occurs concurrently with both an Excusable Delay and a Compensable Delay, the maximum extension of the Contract Time shall be the number of Days, if any, by which such Excusable Delay and Compensable Delay, as determined pursuant to Subparagraph 8.2.8.1, above, exceeds the number of Days of such Unexcused Delay.

**.4** If an Unexcused Delay occurs concurrently with a Compensable Delay, the maximum period of time for which Contractor shall be entitled to a Contract Adjustment to the Contract Price in accordance with Section 3.3 of the Construction Contract shall be the number of Days, if any, by which such Compensable Delay exceeds the number of Days of such Unexcused Delay.

.5 If a Compensable Delay occurs concurrently with an Excusable Delay, the maximum period of time for which Contractor shall be entitled to a Contract Adjustment to the Contract Price in accordance with Section 3.3 of the Construction Contract shall be the number of Days, if any, by which such Compensable Delay exceeds the number of Days of such Excusable Delay.

.6 If an Unexcused Delay occurs concurrently with both an Excusable Delay and a Compensable Delay, the maximum period of time for which Contractor shall be entitled to a Contract Adjustment to the Contract Price in accordance with Section 3.3 of the Construction Contract shall be the number of Days, if any, by which such Compensable Delay exceeds the number of Days of such Unexcused Delay.

8.2.9 **Delay Claims.** Claims by Contractor relating to disputed Contract Adjustments due to Delay shall be made in accordance with applicable provisions of Section 4.3, above.

8.2.10 **Exercise of County Rights.** Notwithstanding any other provision of the Contract Documents to the contrary, County's exercise in accordance with the Contract Documents of any of its rights or remedies permitted by Applicable Laws or the Contract Documents in response to a failure by Contractor or any Subcontractor to comply with the Contract Documents shall not, under any circumstances, entitle Contractor to a Contract Adjustment.

## ARTICLE 9 PAYMENTS AND COMPLETION

### 9.1 PAYMENT BY COUNTY

9.1.1 **Time for Payment.** County shall make payment of undisputed sums due to the Contractor upon Applications for Payment requesting Progress Payment not later than thirty (30) Days after receipt of an Application for Payment requesting Progress Payment that has been properly and timely prepared and submitted by Contractor, and approved by County, in accordance with the requirements of the Contract Documents.

9.1.2 **Not Acceptance.** No approval, inspection or use of, or payment for, the Work by County or by any person or entity acting on County's behalf shall constitute acceptance of Work that is not in accordance with the Contract Documents or a waiver of any of County's rights under the Contract Documents.

9.1.3 **Interest.** If County fails to make payment of an undisputed sum due as a Progress Payment to the Contractor as required by this Article 9, County shall pay interest to the Contractor equivalent to the legal rate set forth in subdivision (a) of California Code of Civil Procedure §685.010. The number of Days available to the County to make payment without incurring such interest shall be reduced by the number of Days by which the County exceeds the seven (7) Day response time applicable to the County set forth in Section 9.5, below. The foregoing is the County's sole obligation with respect to payment of interest earned or accrued on an amount claimed due prior to the commencement by Contractor of legal proceedings for recovery of such amount.

9.1.4 **Disputed Payments.** Subject to Contractor's rights under Section 9.8, below, no good faith dispute or disagreement between County and Contractor with respect to the amount of any payment claimed due by Contractor shall relieve or excuse Contractor from the obligation to proceed with and maintain continuous, expeditious and uninterrupted performance of the Work.

### 9.2 APPLICATIONS FOR PAYMENTS

9.2.1 **Submission by Contractor.** Applications for Payment requesting Progress Payment shall be properly prepared and submitted by Contractor to County once a month on the twenty-fifth (25<sup>th</sup>) Day of the month. If the twenty-fifth (25<sup>th</sup>) Day of the month is a weekend or Holiday, the Application for Payment shall be submitted on the next working day.

9.2.2 **Period of Application.** The period covered by each such Application for Payment requesting Progress Payment shall be not more than thirty (30) Days ending on the twenty-fifth (25<sup>th</sup>) Day of the month in which such Application for Payment is submitted.

9.2.3 **Schedule of Values.** Each Application for Payment shall be accompanied by a Schedule of Values prepared and submitted in accordance with the requirements of the Contract Documents, including, without limitation, the provisions of Section 9.3, below.

9.2.4 **Changes in Work.** Applications for Payment may include requests for payment on account of Compensable Changes in the Work which have been properly authorized by Change Order or Unilateral Change Order.

9.2.5 **Progress Payments.** Applications for Payment requesting Progress Payments shall be based on amounts calculated in accordance with the provisions of Section 9.4, below.

9.2.6 **Percentage Completion.** Applications for Payment requesting Progress Payments shall indicate the Contractor's estimate of the percentage of completion of each line item listed in the Schedule of Values as of the end of the period covered by the Application for Payment.

9.2.7 **Projected Work.** Unless approved by County in writing in advance of an Application for Payment being submitted, which approval may be granted or denied in the sole and absolute discretion of County, Applications for Payment shall only include amounts for Work performed to the twenty-fifth (25<sup>th</sup>) Day of the month in which the Application for Payment was submitted and shall not include request for payment of amounts for Work projected to be performed, stored or delivered beyond that date.

9.2.8 **Disagreements.** In the event of a disagreement between County and Contractor over the accuracy or reasonableness of the Contractor's statement of percentage of progress achieved that is contained in the Application for Payment, the County shall make a Good Faith Determination of the percentage, which percentage shall then be inserted by Contractor in the Application for Payment and the Application for Payment submitted, or resubmitted, incorporating such revision.

9.2.9 **Substantial Completion.** For the sole purpose of the percentage calculation set forth in Paragraph 9.2.6, above, and for no other purpose, the Work shall be deemed one hundred percent complete upon Substantial Completion and the amount released to Contractor shall, subject to County's right to withhold pursuant to Section 9.6, below, be a sum sufficient to increase the total of Progress Payments to Contractor to ninety-five percent (95%) of the Contract Price.

9.2.10 **Certification by Contractor.** Each Application for Payment that is submitted by Contractor shall be signed by Contractor with a certification by Contractor to County that: (1) the data comprising the Application for Payment is accurate and the Work has progressed to the point indicated; (2) to the best of Contractor's knowledge, information and belief, the Work is in accordance with the Contract Documents; (3) Contractor is entitled to payment in the amount certified; and (4) all sums previously applied for by Contractor on account of the Work performed by the Subcontractors and that have been paid by County have been paid to the Subcontractors performing such Work, without any retention, withholding or back charge by Contractor.

9.2.11 **Stored Materials.** County may, in the exercise of its sole and absolute discretion, approve or disapprove for inclusion in Contractor's Application for Payment the cost of materials to be incorporated, but not yet incorporated, in the Work and delivered and suitably stored either at the Site or at some other appropriate location acceptable to the County. As part of any request for such approval, Contractor shall furnish evidence satisfactory to County: (1) of the cost of such materials; (2) that such materials are under the exclusive control of Contractor, or if not, that title to the materials is in the County, free of any lien or encumbrance; and (3) with respect to materials stored off-Site, that the materials are safely and suitably stored in a bonded warehouse with appropriate insurance coverage satisfactory to County. No payment or approval by County pursuant to this Paragraph 9.2.11 shall (a) be construed as an inspection or acceptance of the materials; (b) relieve Contractor of its continuing and sole responsibility for the care and protection of, and sole responsibility for any Loss to, such materials, from any cause whatsoever; or (c) operate as a waiver of rights by County.

9.2.12 **Title.** Contractor warrants that title to all the Work covered by an Application for Payment will pass to County no later than the time of payment. Contractor further warrants that upon submittal of an Application for Payment all Work for which approval for payment has been previously issued by County shall, to the best of Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of



Contractor, the Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials or equipment for the Work.

### 9.3 SCHEDULE OF VALUES

9.3.1 **Initial Submission.** Within twenty-one (21) Days after issuance by County of the Notice of Intent to Award, Contractor shall submit to County a Schedule of Values, prepared in a form and incorporating a level of detail satisfactory to County, that allocates the Contract Price to various portions of the Work, including, without limitation, each portion of the Work to be performed by a Subcontractor, self-performed Work, discrete categories of direct (i.e., on-Site) overhead costs (sometimes referred to as "general conditions costs"), Contractor home office and indirect overhead and profit and amounts reserved for contingencies.

9.3.2 **Balanced Allocation.** The Schedule of Values shall be balanced, reflecting in each line item Contractor's estimated or actual cost commitments for the category of Work included in the line item and a proportionate share of Contractor's overhead and profit. Techniques, such as "front-end loading", designed to create an imbalanced cash flow are strictly prohibited.

9.3.3 **Line Estimates.** Line item values stated in the Schedule of Values that are based on Contractor's estimates, rather than actual subcontract prices, shall be identified as such and replaced with actual subcontract prices when they become available as the subcontracting process progresses.

9.3.4 **Updating.** The Schedule of Values shall be updated by Contractor each month as necessary to reflect the Contractor's actual progress in subcontracting the Work. An updated Schedule of Values shall be attached to each Application for Payment.

9.3.5 **Substantiation.** Contractor shall provide such data as County may reasonably require to substantiate that the Schedule of Values has been prepared in conformance with the requirements of the Contract Documents. Failure to provide such substantiation shall result in the Schedule of Values being deemed incomplete and unapproved by County for use by Contractor in submitting its Applications for Payment.

9.3.6 **Corrections.** If corrections are required in order to make the Schedule of Values comply with the requirements of the Contract Documents, such corrections shall be made as a condition of the Contractor's Application for Payment being considered properly prepared, submitted and complete.

9.3.7 **Changes to Work.** Costs involved in the performance of Work covered by Change Orders, Unilateral Change Orders or Construction Change Directives shall be, at the option of County, either separately scheduled or incorporated as adjustments to the respective trade lines of Work to which they apply. Except as otherwise expressly required by Article 7, above, the Schedule of Values shall not be utilized by Contractor as a basis for calculating Contract Adjustments.

9.3.8 **Applications for Payment.** The Schedule of Values prepared by Contractor in accordance with the requirements of the Contract Documents shall be used as a basis for County's review and approval or disapproval of Applications for Payment.

### 9.4 PROGRESS PAYMENT CONDITIONS

9.4.1 **Progress Payment Amount.** Subject to the other provisions of the Contract Documents, the amount of each Progress Payment requested in an Application for Payment shall be computed as follows:

.1 take that portion of the Contract Price properly allocable to Work (other than materials, products or equipment furnished by County) permanently incorporated at the Site as part of the Work, based on the product derived by multiplying (1) the percentage completion of each such portion of the Work times (2) the portion of the total Contract Price allocated to that portion of the Work in the Schedule of Values, less a retention of five percent (5%) thereof;

.2 add that portion of the Contract Price that is allocable to materials and equipment (other than materials, products or equipment furnished by County) approved by County pursuant to Paragraph 9.2.11, above, and suitably stored at the Site or at a location off-Site, less a retention of five percent (5%) thereof;

.3 subtract the aggregate of previous payments made by the County; and

.4 subtract amounts, if any, that County has determined will be withheld pursuant to an exercise of the County's right to withhold pursuant to Section 9.6, below.

**9.4.2 Other Conditions and Documentation.** Contractor shall submit its Applications for Payment requesting Progress Payments to County using such forms as required by County. Without limitation to any other conditions to payment set forth elsewhere in the Contract Documents, the following shall be conditions precedent to a proper submission, and to County's approval, of each Application for Payment:

.1 submission of a Schedule of Values that complies with Section 9.3, above;

.2 submission of Contractor's certification required by Paragraph 9.2.10, above;

.3 submission of: (1) forms of conditional releases of stop payment notice and bond rights upon progress payment, complying with California Civil Code §8132, for all Work performed during the time period covered by the current Application for Payment, signed by Contractor and the Subcontractors, of every Tier; and (2) forms of unconditional releases of stop payment notice and bond rights upon progress payment, complying with California Civil Code §8134, for all Work performed during the time period covered by the previous Application for Payment, signed by Contractor and the Subcontractors, of every Tier;

.4 compliance by Contractor with its obligation for daily maintenance of Record Drawings and Specifications as required by Paragraph 3.10.1, above;

.5 compliance by Contractor with its obligation for submission of daily reports as required by Paragraph 3.10.2, above;

.6 compliance by Contractor with its obligations for submission of scheduling information and updating of the Construction Schedule as required by Section 3.9, above, and other provisions of the Contract Documents pertaining to preparation or updating of schedules and scheduling information;

.7 proper payment of prevailing wages as defined in California Labor Code §1720, et seq.;

.8 timely submission of adequate and complete certified payroll records for any time period that Work was performed and for which payment is being requested;

.9 submission of certifications by Contractor and the Subcontractors as required by Applicable Laws certifying that all employee benefit contributions due and owing have been paid in full;

.10 submission of sales tax information as required by Paragraph 3.6.3, above; and

.11 compliance by Contractor with all of its other obligations for submission of documentation or performance of conditions which, by the terms of the Contract Documents, constitute conditions to Contractor's right to receive payment for Work performed.

## **9.5 COUNTY APPROVAL/REJECTION OF APPLICATIONS FOR PAYMENT**

**9.5.1 Review by County.** Subject to County's rights under Paragraph 9.5.4, below, County shall promptly review Applications for Payment submitted by Contractor and provide its approval or disapproval, in whole or part, within (1) seven (7) Days after receipt of an Application for Payment requesting Progress Payment, and (2) within fourteen (14) Days after receipt of an Application for Payment requesting Final Payment.

**9.5.2 Disapproval by County.** Disapproval by County disapproving of an Application for Payment shall be accompanied by an explanation of the reasons for such disapproval. Failure by County to specify in its disapproval a particular grounds for disapproval of an Application for Payment shall not waive the County's right to assert such grounds as a basis for any future disapproval, or nullification of its prior approval, of that or any other Application for Payment.

**9.5.3 Re-submittal by Contractor.** An Application for Payment that is disapproved by County shall be corrected and re-submitted by Contractor after receipt by Contractor of the notice of disapproval. A re-submitted Application for Payment shall be reviewed and responded to by County in the same manner as provided in Paragraphs 9.5.1 and 9.5.2, above. If re-submitted, the re-submitted Application for Payment shall be reviewed and responded to by County in the same manner as provided in Paragraph 9.5.1 and Paragraph 9.5.2, above. If not re-submitted, only the amount, if any, that is approved for payment shall be paid until such time as a proper Application for Payment that includes the disapproved amount has been submitted in another Application for Payment and, upon such re-submittal, approved for payment.

**9.5.4 Approval Nullification.** County reserves the right to nullify any prior approval of an Application for Payment that is later found to not be in compliance with the requirements of the Contract Documents, whether or not such noncompliance was previously actually observed or apparent on the face of the Application for Payment, and based on such nullification County may take either of the following actions, as applicable: (1) if the Application for Payment has not yet been paid by County, disapprove of that portion of the Application for Payment that is not in compliance and withhold payment of that sum until the noncompliance is fully rectified; or (2) if the Application for Payment has been paid by County, nullify the County's prior approval and withhold payment of such disputed amounts in response to future Applications for Payment; provided, however, that in either case the amount of the County's nullification shall be limited to that portion of the amount requested in the Application for Payment that is in dispute and the amount of its withholding from the current or any future Application for Payment shall be limited to the amount nullified plus any additional withholding permitted under Section 9.6, below.

**9.5.5 No Waiver by County.** Neither approval by County or Architect of, failure by County to exercise its right of nullification with respect to, nor payment by County upon, an Application for Payment or any portion thereof shall be interpreted as or constitute a waiver or release of any of County's rights to require Contractor's full compliance with the Contract Documents.

**9.5.6 No Representation.** Neither approval by County or Architect of, failure by County to exercise its right of nullification with respect to, nor payment by County upon, an Application for Payment or any portion thereof shall be interpreted as a representation that County or Architect has: (1) made exhaustive or continuous on-Site inspections to check the quality or quantity of the Work, (2) reviewed Contractor's construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from the Subcontractors and other data requested by County or Architect to substantiate Contractor's right to payment, or (4) made examination to ascertain how or for what purpose Contractor has used money previously paid on account of the Contract Price.

## 9.6 WITHHOLDING OF PAYMENT

**9.6.1 Grounds for Withholding.** County may decline to approve an Application for Payment and withhold payment requested under any unpaid Application for Payment, in whole or in part, to such extent that County makes a Good Faith Determination that withholding is necessary, in the sole discretion of County, because of any of the following circumstances:

**.1 Third-Party Claims.** Third-party claims or stop payment notices filed or reasonable evidence (including, without limitation, failure by Contractor to submit conditional releases of stop payment notice and bond rights required by the Contract Documents) indicating the possible filing of such claims or stop payment notices.

**.2 Defective Work.** Defective Work not remedied.

**.3 Nonpayment.** Failure of Contractor to make proper payments to a Subcontractor for services, labor, materials or equipment or other Work.

**.4 Inability to Complete.** Reasonable doubt that the Work can be completed for the then unpaid balance of the Contract Price or within the Contract Time.

**.5 Violation of Applicable Laws.** Failure of Contractor or a Subcontractor to comply with Applicable Laws.

**.6 Penalty.** Any penalty asserted against County by virtue of Contractor's failure to comply with Applicable Laws.

**.7 Lack of Progress.** Failure by Contractor to maintain progress in accordance with the Construction Schedule.

**.8 Setoff.** Any reason specified elsewhere in the Contract Documents as grounds for a withholding, offset or setoff or that would legally entitle County to a setoff or recoupment.

**.9 Consultant Services.** Additional professional, consultant or inspection services required due to Contractor's failure to comply with the Contract Documents.

**.10 Liquidated Damages.** Liquidated damages payable to County pursuant to Section 3.2 of the Construction Contract or that there is a reasonable basis to believe will be payable to County based upon the Contractor's project date for Substantial Completion based on its update Construction Schedule or based upon other evidence available to County of the probable date that the Work will be Substantially Completed.

**.11 Damage.** Loss caused to County, a Separate Contractor or any other person or entity under contract to County, by Contractor or a Subcontractor.

**.12 Cleanup.** Cleanup performed by County and chargeable to Contractor pursuant to the terms of the Contract Documents.

**.13 Employee Benefits.** Failure of Contractor to pay contributions due and owing to employee benefits funds pursuant to any applicable collective bargaining agreement or trust agreement.

**.14 Required Documents.** Failure of Contractor to submit on a timely basis, proper and complete documentation required by the Contract Documents, including, without limitation, schedule updates, 'look ahead' schedules, pricing information, certifications and other required reports or documentation.

**.15 Labor Compliance.** Failure of Contractor or any Subcontractor to properly pay prevailing wages as defined in California Labor Code §§1720 et seq.

**.16 Nullification.** Nullification by County pursuant to Paragraph 9.5.4, above, of its prior approval of an Application for Payment.

**.17 Releases.** Failure by Contractor to submit any conditional release of stop payment notice and bond rights that is required pursuant to Subparagraph 9.4.2.3, above or Subparagraph 9.10.4.4, below.

**.18 Other Breach.** A breach by Contractor of any obligation or provision of the Contract Documents.

**9.6.2 Application of Withholding.** Sums properly withheld pursuant to Paragraph 9.6.1, above, may be used by County without a prior judicial determination of County's actual rights with respect to the grounds on which such withholding is based. Contractor agrees and hereby designates County as its agent for such purposes, and agrees that such payments shall be considered as payments made under the Construction Contract by County to Contractor. County shall submit to Contractor an accounting of such funds disbursed on behalf of Contractor. As an alternative to such payment, County may, in its sole and absolute discretion, elect to exercise its right to adjust the Contract Price as provided in Section 13.4, below.

9.6.3 **Final Payment.** In accordance with California Public Contract Code §7107, the amount to be withheld from Contractor's Final Payment pursuant to a withholding asserted pursuant to Paragraph 9.6.1, above, shall be limited to one hundred fifty percent (150%) of the disputed amount.

9.6.4 **Release of Withholding.** When the reasons for withholding of payment as set forth in Paragraph 9.6.1, above, are removed, approval by County will be promptly issued to Contractor for amounts previously withheld and payment of amounts withheld will be made by County within thirty (30) Days thereafter.

9.6.5 **Additional Rights.** The County's right of withholding set forth in this Section 9.6 is in addition to, and not a limitation upon, any other rights of withhold that County may have under the Contract Documents or Applicable Laws.

## 9.7 PAYMENTS BY CONTRACTOR

9.7.1 **Payments to Subcontractors.** Contractor shall not include in its Applications for Payment sums on account of any Subcontractor's portion of the Work that it does not intend to pay to such Subcontractor. Upon receipt of payment from County, Contractor shall pay the Subcontractors performing the Work, out of the amount paid to Contractor on account of such Subcontractors' portions of the Work, the amount to which said Subcontractors are entitled in accordance with the terms of their contracts with Contractor and Applicable Laws, including, without limitation, California Public Contract Code §7107. Contractor shall remain responsible, notwithstanding a withholding by County pursuant to the terms of these General Conditions, to promptly satisfy from its own funds sums due to all the Subcontractors who have performed the Work that is included in Contractor's Application for Payment. Contractor shall, by appropriate agreement, require each Subcontractor to make payments to its sub-subcontractors and suppliers in similar manner. County shall have no obligation to pay or be responsible in any way for payment to the Subcontractors, of any Tier.

9.7.2 **Payments in Trust.** Any funds that Contractor receives in payment for services or Work performed by a Subcontractor shall constitute assets of a trust, which trust funds shall be used for the exclusive benefit of the Subcontractor for the purpose of discharging Contractor's financial obligations on account of labor, services, materials or equipment furnished to the Project by the Subcontractor, provided that such labor, services, materials or equipment were performed in accordance with the Contract Documents, were included in an Application for Payment to County, and were paid by the County to Contractor. Contractor shall be the trustee of the trust and shall be required to deal with the trust assets for the benefit of the Subcontractor. Contractor shall not be a beneficiary of the trust. Nothing herein shall be construed as an intent to require that Contractor maintain trust funds in separate bank accounts, specifically designate any third party as a beneficiary of the trust created herein, or otherwise give rise to any cause of action against the County by any third party beneficiary of the trust created herein.

9.7.3 **Payment Information.** County will, on request, furnish to any of the Subcontractors, if practicable, information for such Subcontractor's review regarding percentages of completion or amounts applied for by Contractor and action taken thereon by County on account of portions of the Work done by such Subcontractor.

9.7.4 **Joint Payment.** County shall have the right, if deemed necessary in its sole discretion, to issue joint checks made payable to Contractor and any of the Subcontractors, of any Tier. The joint check payees shall be solely responsible for the allocation and disbursement of funds included as part of any such joint payment. Endorsement on such check by a payee shall be conclusively presumed to constitute receipt of payment by such payee. In no event shall any joint check payment be construed to create: (1) any contract between County and any of the Subcontractors, of any Tier; (2) any obligation from County to any of the Subcontractors; or (3) any third-party rights against County or Architect.

9.7.5 **Direct Negotiation of Stop Payment Notices.** County shall have the right to directly discuss, negotiate, settle or pay, without notice to or participation by Contractor, any stop payment notice claims asserted by the Subcontractors, of any Tier, and to deduct such sums paid from sums due to Contractor.

9.7.6 **Release of Stop Payment Notices.** With the exception of that portion, and only that portion, of a stop payment notice or other claim that arises as a result of a failure by the County to make payment to Contractor under circumstances constituting a breach of the Construction Contract by County, if any stop payment notice or other claim, whether invalid or valid, is filed with, served upon or made or asserted against the County or the Site by any

Subcontractor, of any Tier, or their agent or employee, for money claimed due, then Contractor shall within five (5) Days after written notice by the County procure, furnish and record appropriate releases or other instruments which under Applicable Laws will fully release, extinguish and remove such stop payment notice or claim, as well as any notices of pending action or other notices recorded against the Site in connection with the enforcement thereof. All costs of such actions by Contractor shall be paid for by Contractor at Contractor's Own Expense. Unless and until fully released as aforesaid, the County shall have the right to retain from any payment then due, or thereafter to become due, to Contractor an amount equal to one hundred and fifty percent (150%) of the amount necessary to satisfy, discharge and defend against any such stop payment notice or claim and any action or proceeding thereon, including, without limitation, an amount for anticipated attorney's fees and costs. If the amount to be paid, or the amount retained, is insufficient to satisfy, discharge and defend against any such stop payment notice or claim and any action or proceeding thereon, then Contractor shall be liable for the difference and upon demand shall immediately deposit the same with the County. The provisions of this Paragraph 9.7.6 are in addition to such other rights as the County may have against Contractor under the Contract Documents or Applicable Laws.

**9.7.7 No County Obligation.** Neither County nor Architect shall have any obligation to pay or to see to the payment of money to any of the Subcontractors except as may otherwise be required by Applicable Laws.

## **9.8 FAILURE OF PAYMENT**

If, through no fault of Contractor or failure by Contractor to comply with its obligations under the Contract Documents either: (1) approval or disapproval by County of an Application for Payment properly prepared and submitted by Contractor and requesting payment that is otherwise undisputed by County is not issued within the time period required therefor by the terms of this Article 9; or (2) the County does not (a) upon an Application for Payment properly prepared and submitted by Contractor pay to Contractor, within the time period required for payment by County, an undisputed amount approved by County as earned, which approval has not been, and is not thereafter, nullified by County, or (b) pay to Contractor an amount that has been awarded by arbitration or judgment of a court of competent jurisdiction, then Contractor may, following delivery to County of a written "10-day stop work order", stop the Work until, as applicable, an approval or disapproval by County, or payment by County, is received by Contractor. Promptly upon receipt of such approval or disapproval, or payment, as applicable, Contractor shall resume the Work. Any resulting Delay associated with the shut down and start up of the Work as a result of Contractor's proper exercise of its right to stop work under this Section 9.8 shall constitute a Compensable Delay.

## **9.9 SUBSTITUTION OF SECURITIES FOR RETENTION**

**9.9.1 Public Contract Code.** Pursuant to the requirements of California Public Contract Code §22300, upon the Contractor's request, the County will make payment to the Contractor of any funds withheld from payments to ensure performance under the Contract Documents if the Contractor deposits with the County, or in escrow with a California or federally chartered bank in California acceptable to the County ("Escrow Agent"), securities eligible for the investment of State Funds under Government Code §16430, or bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and the County, upon the following conditions:

**.1** The Contractor shall be the beneficial owner of any securities substituted for monies withheld for the purpose of receiving any interest on such securities.

**.2** All expenses relating to the substitution of securities under said §22300 and under this Section 9.9, including, but not limited to the County's overhead and administrative expenses and expenses of Escrow Agent, shall be the responsibility of the Contractor.

**.3** Securities or certificates of deposit substituted for monies withheld shall be of a value of at least equivalent to the amounts of the retention to be paid to the Contractor pursuant to the Contract Documents.

**.4** If the Contractor shall choose to deposit securities in lieu of monies withheld with an Escrow Agent, the Contractor, the County and Escrow Agent shall, as a prerequisite to such deposit, enter into an escrow agreement. Such escrow agreement shall be substantially in the form "Escrow Agreement for Security Deposits in Lieu of Retention" set forth in California Public Contract Code §22300(f).

.5 The Contractor shall obtain the written consent of Surety to such agreement.

.6 Securities, if any, shall be returned to the Contractor only upon satisfactory Final Completion of the Work.

9.9.2 **Substitute Security.** To minimize the expense caused by such substitution of securities, the Contractor shall, prior to or at the time the Contractor requests to substitute security, deposit sufficient security to cover the entire amount to be withheld. Should the current market value of such substituted security at any time fall below the amount for which it was substituted, or any other amount which the County withholds pursuant to the Contract Documents, the Contractor shall immediately and at the Contractor's Own Expense deposit additional security qualifying under said §22300 until the current market value of the total security deposited is no less than the amount subject to withholding under the Contract Documents. Securities shall be valued as often as conditions of the securities market warrant, but in no case less frequently than once per month.

9.9.3 **Deposit of Retentions.** Alternatively, subject to the conditions set forth in Paragraph 9.9.1, above, upon request of the Contractor, the County shall make payment of retentions directly to Escrow Agent at the expense of the Contractor, provided that the Contractor, the County and Escrow Agent shall, as a prerequisite to such payment, enter into an escrow agreement in the same form as prescribed in Subparagraph 9.9.1.4, above. At the Contractor's Own Expense, the Contractor may direct the investment of the payments into securities and interest bearing accounts and the Contractor shall receive the interest earned on the investments. Escrow Agent shall hold such direct payments by the County under the same terms provided herein for securities deposited by the Contractor. Upon satisfactory Final Completion of the Work, the Contractor shall receive from Escrow Agent all securities, interest and payments received by Escrow Agent from the County, less escrow fees and charges of the Escrow Account, according to the terms of said §22300 and the Contract Documents.

#### 9.10 FINAL PAYMENT

9.10.1 **Payment by County.** Subject to the County's right of withholding as set forth in Section 9.6, above, or elsewhere in the Contract Documents, Final Payment shall be made by County not more than sixty (60) Days after completion of the Work as defined in Clauses (1), (2), (3) or (4) of California Public Contract Code § 7107(c), whichever definition is earliest satisfied.

9.10.2 **Application for Final Payment.** Upon issuance by County of the Notice of Final Completion pursuant to Paragraph 9.13.5, below, Contractor shall submit to County its Application for Payment requesting Final Payment.

9.10.3 **Review by County.** County will review and approve or disapprove of the Application for Payment requesting Final Payment as provided in Section 9.5, above.

9.10.4 **Conditions to Final Payment.** Without limitation to any other conditions to payment set forth elsewhere in the Contract Documents, the following shall be conditions to a proper submission, and to County's approval, of Contractor's Application for Payment requesting Final Payment:

- .1 submission of Contractor certification as required by Paragraph 9.2.10, above;
- .2 submission of consent of Surety, if any, to Final Payment;
- .3 submission of a certificate evidencing that the insurance required by the Contract Documents is in force;
- .4 submission of conditional releases and waivers of stop payment notice and bond rights upon final payment in the form required by California Civil Code §8136 executed by Contractor and by all the Subcontractors, of every Tier;
- .5 submission of all Close-Out Documents (including, without limitation, complete, accurate Record Drawings and Specifications certified by Contractor as required by Paragraph 3.10.1, above);

.6 timely submission of adequate and complete certified payroll records for any time period that Work was performed, which have not been submitted by Contractor in connection with its previous Applications for Payment;

.7 proper payment of prevailing wages as defined in California Labor Code §§1720, et seq.;

.8 submission of certifications by Contractor and each Subcontractor, as required by any applicable collective bargaining agreement or trust agreement or Applicable Laws, certifying that all employee benefit contributions due and owing have been paid in full; and

.9 submission of any other documents or information required by the Contract Documents as a condition of Final Payment or Final Completion.

**9.10.5 Disputed Amounts.** Pursuant to California Public Contract Code § 7107, County may deduct and withhold from Final Payment an amount of up to one hundred fifty percent (150%) of any disputed amounts, including, without limitation, amounts to protect County against any Loss caused or threatened as a result of Contractor's failing to fully satisfy the conditions of Final Completion and Final Payment.

**9.10.6 No Waiver by County.** The making of Final Payment by County shall not constitute a waiver by County of any rights or claims, including, without limitation, any right or claim for reimbursement of Allowable Costs or Allowable Markup paid to Contractor that is determined by County, either before or after Final Payment, to have been not due to Contractor.

#### **9.10.7 WAIVER BY CONTRACTOR.**

**ACCEPTANCE OF FINAL PAYMENT BY CONTRACTOR OR A SUBCONTRACTOR SHALL CONSTITUTE A WAIVER OF ALL RIGHTS BY THAT PAYEE AGAINST COUNTY FOR RECOVERY OF ANY LOSS, EXCEPTING ONLY THOSE CLAIMS THAT HAVE BEEN SUBMITTED BY CONTRACTOR IN THE MANNER REQUIRED BY SECTION 4.3, ABOVE, PRIOR TO, OR AT THE TIME OF CONTRACTOR'S SUBMISSION TO COUNTY OF, ITS APPLICATION FOR PAYMENT REQUESTING FINAL PAYMENT.**

#### **9.11 SUBSTANTIAL COMPLETION**

**9.11.1 Contract Time.** Contractor shall achieve Substantial Completion of the Work, or such portion of the Work as may be designated at any time by County for separate delivery, in accordance with the requirements of the Contract Time and other provisions of the Contract Documents.

**9.11.2 Request for Inspection.** Contractor shall notify the County when Contractor believes that the Work, or portion thereof designated by the County in the Contract Documents or otherwise for separate delivery, is Substantially Complete.

**9.11.3 Substantial Completion Inspection.** When Contractor gives notice to County that it has achieved Substantial Completion of the Work, or a County designated portion thereof, unless the County determines that the Work or County designated portion thereof is not sufficiently complete to warrant an inspection to determine Substantial Completion, County, Inspector of Record, Architect and such others as may be designated by County will inspect the Work, or such County designated portion thereof.

**9.11.4 Substantial Completion Punch List.** At the conclusion of such inspection, County shall prepare and give to Contractor (or, Owner may request that Contractor prepare and provide to County) a Substantial Completion Punch List of items, if any, to be completed or corrected for Substantial Completion. If Contractor disputes any of the items included, it shall so note its objection on the Substantial Completion Punch List. Contractor shall proceed within forty-eight (48) hours after preparation of the Substantial Completion Punch List to commence correction or completion of the items on the Substantial Completion Punch List, including, without limitation, any disputed items, and all such items of Work shall be completed promptly by Contractor before the Work will be considered as Substantially Complete. Failure by County, Architect, Inspector of Record or Contractor to include an item on the Substantial Completion Punch List does not alter the responsibility of Contractor to perform the Work in accordance with the Contract Documents. Items of Work necessary for Substantial Completion that, for any reason, have been omitted from the Substantial



Completion Punch List shall be added to the Substantial Completion Punch List and Contractor shall, at the request of County, Architect or Inspector of Record made at any time prior to Final Payment commence correction or completion of such items within forty-eight (48) hours and all such items of Work shall be completed by Contractor promptly and before the Work will be considered as Substantially Complete.

**9.11.5 Re-Inspection.** Contractor shall notify County when the items of Work shown on the Substantial Completion Punch List are completed. County, Inspector of Record, Architect and such others as County deems necessary or appropriate will then make a further inspection to determine whether such Work is Substantially Complete. If such inspection, or any subsequent re-inspection required pursuant hereto, discloses any item, whether or not included on the Substantial Completion Punch List, which must be completed or corrected before Substantial Completion, Contractor shall, as a condition of Substantial Completion, complete or correct such item, which shall then be re-inspected to confirm that such Work is Substantially Complete. Contractor shall reimburse County, or County may at its option withhold from Contractor's payments, amounts incurred by County to the Inspector of Record, Architect, County Consultants or others whose services, for reasons within the control or responsibility of Contractor or the Subcontractors, are necessary for more than two (2) such re-inspections to determine Substantial Completion.

**9.11.6 Notice of Substantial Completion.** When County determines that the Work, or such designated portion thereof, is Substantially Complete, County will prepare a Notice of Substantial Completion on the County's form, which shall state the date of Substantial Completion. If the Notice of Substantial Completion is for the entire Work, then the County will attach to it the Final Completion Punch List prepared in accordance with Paragraph 9.13.2, below. Regardless of the date the Notice of Substantial Completion is issued, Substantial Completion shall be deemed to have occurred on the date stated in the Notice of Substantial Completion.

## **9.12 PARTIAL OCCUPANCY OR USE**

County reserves the right to beneficially occupy all or any portion of the Work at any time before Substantial Completion of the entire Work. Beneficial occupancy means that County has assumed physical occupancy and use of all or such portion of the Work. Commencement of improvements or other work by Separate Contractors in order to ready the Work for use or occupancy by County shall be unconditionally permitted in all cases prior to Substantial Completion and shall not constitute a taking of beneficial occupancy by County. Exercise by County in accordance with the provisions of this Section 9.12 of its right to take beneficial occupancy shall not constitute grounds for a Contract Adjustment. The County's right of beneficial occupancy of all or a portion of the Work prior to Substantial Completion shall be subject to the following conditions:

**9.12.1** County and such others as County deems necessary will make an inspection of the portion of the Work to be beneficially occupied and prepare a list of items to be completed or corrected in the same manner as required by and subject to the same conditions as set forth in Section 9.11, above.

**9.12.2** Beneficial occupancy by County shall not be construed as Acceptance of that portion of the Work which is to be occupied.

**9.12.3** Except as otherwise provided in this Section 9.12, beneficial occupancy by County shall not constitute a waiver of rights of the County against Contractor. Notwithstanding anything stated in this Section 9.12 or elsewhere in the Contract Documents to the contrary, beneficial occupancy by County shall not constitute a waiver of rights of County relating to Defective Work in the area beneficially occupied or in any other portion of the Work.

**9.12.4** Prior to the County's taking beneficial occupancy, Contractor shall submit to County an itemized list of each piece of equipment located in or serving the area to be occupied stating the date operation of such piece of equipment commenced, together with operating instructions, manuals and other information required by the Contract Documents. Contractor shall provide, in the areas beneficially occupied, on a continual basis, utility services, elevator service, and heating and cooling systems in operable condition commencing at the time of beneficial occupancy and until Final Completion of the entire Work. County shall be responsible, from and after taking occupancy, for utility consumption, regular operation and regular maintenance of such systems or equipment.

**9.12.5** County shall pay all normal operating and maintenance costs resulting from its use of equipment in areas beneficially occupied.

9.12.6 County shall pay all utility costs that arise out of its beneficial occupancy.

9.12.7 Contractor shall not be responsible for providing security in areas beneficially occupied.

9.12.8 County shall use its best efforts to prevent its beneficial occupancy from interfering with the conduct of Contractor's remaining Work.

9.12.9 Contractor shall not be required to repair damage caused solely by County's beneficial occupancy.

9.12.10 Contractor shall continue to maintain all insurance required by the Contract Documents in full force and effect.

### 9.13 FINAL COMPLETION

9.13.1 **Contract Time.** Contractor shall expeditiously and diligently perform the Work after Substantial Completion, including, without limitation, all items of Work on the Final Completion Punch List that accompanies the Notice of Substantial Completion, so as to achieve Final Completion within the requirements of the Contract Time for Final Completion.

9.13.2 **Final Completion Punch List.** Contractor shall prepare and submit to County at the time that Contractor requests inspection for Substantial Completion of the entire Work pursuant to Paragraph 9.11.2, above, a draft proposed Final Completion Punch List of items of Work that will be required to be completed or corrected for Final Completion. Items identified in the course of any inspection for Substantial Completion that are required to Finally Complete the Work following Substantial Completion shall be added to the proposed Final Completion Punch List and the revised Final Completion Punch List attached to the Notice of Substantial Completion. If Contractor disputes any of the items included, it shall so note its objection on the Final Completion Punch List. When Contractor considers the Final Completion Punch List to be complete, it shall promptly sign and deliver the Final Completion Punch List to the County. Failure by County, Architect, Inspector of Record or Contractor to include an item on the Final Completion Punch List does not alter the responsibility of Contractor to perform the Work in accordance with the Contract Documents. Items of Work necessary for Final Completion that, for any reason, have been omitted from the Final Completion Punch List shall be added to the Final Completion Punch List upon request by the County made at any time prior to Final Payment and completion of such items shall be made promptly and before the Work will be considered Finally Complete.

9.13.3 **Performance of Punch List.** Contractor shall proceed promptly and in accordance with the Contract Time to correct and complete the items on the Final Completion Punch List, including, without limitation, any disputed items, and all such items of Work shall be completed by Contractor before the Work will be considered as Finally Complete.

9.13.4 **Request for Final Inspection.** Contractor shall notify County when Contractor believes that the Work is Finally Complete. County, Inspector of Record, Architect and such others as County deems necessary or appropriate will then make a further inspection to determine whether such Work is Finally Complete. If such inspection, or any subsequent re-inspection required pursuant hereto, discloses any item, whether or not included on the Final Completion Punch List, which must be completed or corrected before Final Completion, Contractor shall, as a condition of Final Completion, complete or correct such item, which shall then be re-inspected to confirm that such Work is Finally Completed. Contractor shall reimburse County, or County may at its option withhold from Contractor's payments, amounts incurred by County to the Inspector of Record, Architect, County Consultants or others whose services, for reasons within the control or responsibility of Contractor or the Subcontractors, are necessary for more than two (2) inspections to determine Final Completion.

9.13.5 **Notice of Final Completion.** When County determines that the Work is Finally Complete, County will prepare a Notice of Final Completion on the County's form, which shall state the date of Final Completion. Regardless of the date the Notice of Final Completion is issued, Final Completion shall be deemed to have occurred on the date stated in the Notice of Final Completion.

9.13.6 **Acceptance by County.** Acceptance may be exercised by County, in its sole and absolute discretion, either after Final Completion or, without waiving or releasing Contractor from any of its obligations under the Contract Documents, at any time after Substantial Completion and prior to Final Completion.

9.13.7 **Notice of Completion.** In addition to issuance of the Notice of Substantial Completion and Notice of Final Completion, County shall have the right, exercised in its sole and absolute discretion, to record a Notice of Completion pursuant to California Civil Code §9204.

9.13.8 **No Waiver by County.** No inspections conducted pursuant to this Article 9 nor any approvals or certificates issued by County, Architect or Inspector of Record shall be deemed to be a waiver or limitation on County's right to insist on Final Completion and full performance of all other conditions to Final Payment under the Contract Documents prior to issuance of Final Payment to Contractor.

## **ARTICLE 10 INSPECTIONS, SAFETY AND HAZARDOUS SUBSTANCES**

### **10.1 INSPECTIONS**

10.1.1 **General.** One or more Inspectors of Record, including special inspectors as required, may be employed by County and assigned to the Work. The fees of Inspectors of Record shall be directly paid for by County. IF INSPECTORS OR RECORD ARE ASSIGNED TO THE WORK, THEN NO WORK SHALL BE CARRIED ON EXCEPT UNDER THE INSPECTION, AND WITH THE KNOWLEDGE, OF THE APPROPRIATE INSPECTOR(S) OF RECORD, and Contractor shall be responsible, at Contractor's Own Expense, to remove and replace any Work performed without such inspection by the appropriate Inspector of Record.

10.1.2 **Coordination.** Contractor shall schedule, arrange, and coordinate its activities with the activities of the County, Inspectors of Record, Architect, County Consultants and others designated by County to inspect or observe the Work. When, in order to comply with the intent of the Contract Documents, inspection or observation must be made at the plant or mill of the manufacturer or fabricator of material or equipment, Contractor shall notify the County, as well as any other persons identified by County as assigned by it to inspect or observe the Work, a sufficient length of time in advance to allow for arrangements to be made for such inspection or observation.

10.1.3 **Uncovering of Work.** County or an Inspector of Record shall have the right to request that any portion of the Work be uncovered by Contractor for inspection. Except as otherwise provided in Paragraph 10.1.1, above, if such Work is found to be in accordance with the Contract Documents, then all of the additional costs incurred in uncovering, replacing and re-covering the Work shall constitute grounds for Contractor, upon proper notice and request pursuant to Article 7, above, to receive a Contract Adjustment for Compensable Change and if such uncovering, replacing and re-covering of the Work causes a Delay, such Delay shall constitute grounds for Contractor, upon proper and timely notice and request pursuant to Article 8, above, to receive a Contract Adjustment for Compensable Delay. If such Work is not in accordance with the Contract Documents, then such costs of uncovering, replacing and re-covering shall be paid for by Contractor at Contractor's Own Expense and any resulting Delay shall be consider an Unexcused Delay.

10.1.4 **Off-Hours Inspections.** Contractor shall request approval by County before arranging any inspections either: (1) before 7:00 am or after 3:00 pm on Monday through Friday, or (2) on any Saturday, Sunday, holiday or any other time when Work is not usually in progress. Such request shall be delivered to County at least two (2) working days in advance of the inspection being performed. Approval or disapproval of such request is in the sole and absolute discretion of County. Except where such off-hours inspections are due to a breach by County of an obligation under the Contract Documents, the additional cost (over and above that which would be required for inspections during regular business hours) to County of the inspection shall be paid for by Contractor at Contractor's Own Expense.

10.1.5 **Access to the Work.** Contractor shall make available for use by County, Inspectors of Record, Architect, County Consultants and others assigned to inspect or observe the Work, any equipment (wheelbarrow, shovel, ladder, man-lift, etc.) that is available or in use on Site, and is required to assist in such inspections or observations.

10.1.6 **Right to Stop Work.** County shall have the right, but not the obligation, to order Contractor to stop performance of Work. Inspectors of Record shall, only if and to the extent permitted by Applicable Laws or if they are given written authority to do so by County, have the authority, but not the obligation, to stop the Work whenever provisions of Contract Documents are not being complied with, or the conduct of the Work poses a probable risk of harm to persons or property.

10.1.7 **No County Duty.** No authority of the County, Inspectors of Record, Architect, County Consultants or others designated by County to inspect the Work that is conferred by the Contract Documents nor any decision made by any of them in good faith either to exercise or not exercise such authority, nor any recommendation by any of them, shall give rise to a duty or responsibility on the part of any of them to Contractor or to the Subcontractors, of any Tier.

10.1.8 **Contractor Responsibility.** Inspections or observations by the County, Inspectors of Record, County Consultants or others shall not in any way relieve Contractor from its sole responsibility for full compliance with all of the terms and conditions of the Contract Documents, nor be construed to lessen, to any degree, Contractor's responsibility for providing efficient and capable superintendence as required herein or for incorporating into the Work only those items of the Work that conform to the Contract Documents.

10.1.9 **Reimbursement to County.** Without limitation to any other provisions of the Contract Documents, Contractor shall reimburse the County at Contractor's Own Expense, or County shall have the right, at its option, to withhold from payments due to Contractor, costs of inspections, observations or testing and other Losses that are incurred for any of the following reasons: (1) Contractor has failed to execute the Work in accordance with the Contract Documents; (2) materials or equipment have been substituted by Contractor, without prior approval by the County and Architect; (3) Defective Work; or (4) to conduct load testing of certain portions of the structure that have not fully met the requirements of the Contract Documents.

## 10.2 SAFETY PRECAUTIONS AND PROGRAMS

10.2.1 **General Safety Obligation.** Contractor shall, notwithstanding the activities of others (such as, but not limited to, the County, Architect, Inspectors of Record, County Consultants or others designated by County to prepare safety recommendations or inspect or observe the Work), be solely responsible, on a twenty-four (24) hours a Day, seven (7) Days a week basis, for initiating, maintaining and supervising all safety precautions and programs on the Site in connection with the preparation, performance, observation or inspection of the Work, including all necessary precautions to protect and safeguard all persons and property from loss, injury, death or damage resulting, directly or indirectly, from the activities of Contractor or the Subcontractors, including, without limitation, all of the following:

- .1 persons in and around the Site, as well as their personal property and vehicles;
- .2 the Work, materials and equipment to be incorporated therein under care, custody or control of Contractor or the Subcontractors, of any Tier, whether in storage on or off the Site, including, without limitation, the provision of temperature control, covering and enclosures necessary to prevent Loss due to adverse weather conditions;
- .3 other property at the Site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, curbs, roadways, structures (including, without limitation, protection from settlement or loss of lateral support) and utilities not designated for removal, relocation or replacement in the course of construction; and
- .4 construction and operations by the County, Architect and Inspectors of Record.

10.2.2 **Contractor's Safety Program.** Prior to starting the Work, Contractor shall prepare and submit to County a Safety Program, which shall comply with the requirements of the Contract Documents and shall include, at a minimum, guidelines, requirements and procedures for the following: safety management policy; emergency response plan; illness and injury prevention procedures; safety meetings; accident investigation; basic accident causes; safety inspection checklist; fire prevention and control; report forms; and employee safety manual and procedures for achieving compliance with safety requirements of insurers. A copy of the Safety Program shall be maintained on Site at all times and provided to the County upon request. Contractor is solely responsible for monitoring activities at the Site for compliance with the Safety Program and for the enforcement thereof.

**10.2.3 Safety Orders.** Contractor shall comply with all Applicable Laws, including, without limitation, all safety laws, standards, orders, rules, regulations and building codes, to prevent accidents or injury to persons on, about or adjacent to the Site and to provide a safe and healthful place of employment. Contractor shall, at Contractor's Own Expense, correct any violations of Applicable Laws occurring or threatened by conditions on the Site.

**10.2.4 Safety Representative.** Contractor shall designate a responsible member of its organization on the Site, who meets the qualification and competency requirements of Applicable Laws and whose sole duty shall be giving safety instructions, prevention of accidents and overall job site safety (including, without limitation, posting of information and other notices regarding safety that are required under occupational safety and health laws and compliance with reporting and other occupational safety requirements pertaining to the protection of the life, safety and health of the workers). The name of the person so designated shall be reported to the County by Contractor prior to the commencement of any Work on the Site.

**10.2.5 Protection.** Contractor shall take reasonable precautions to protect the Work and all building materials, equipment, temporary field offices, storage sheds, and other public and private real and personal property that might be affected, directly or indirectly, by Contractor's activities associated with performance of the Work, and shall make good, at Contractor's Own Expense, all Loss due to failure to provide such reasonable precautions.

**10.2.6 Safeguards, Disabled Access.** Contractor shall erect and maintain, as required by existing conditions and performance of the Work, all necessary safeguards for safety and protection, including, without limitation, safety devices, belts, nets, barriers, safety rails, canopies, danger signs, fire protection, no smoking prohibitions, warnings against hazards, safety regulations postings and notifications to owners and users of adjacent sites and utilities, and shall, as required by Applicable Laws, make provision for access for, and provide assistive devices to, persons with disabilities, including, without limitation, providing safe pathways of travel around areas where construction is being performed so that occupants, visitors, the public and others on the Site with disabilities are afforded reasonably direct and barrier-free access to areas of the Site and Existing Improvements.

**10.2.7 Fire, Explosives, Hazardous Substances.** Contractor shall take all necessary precautions to guard against and eliminate possible fire hazards. Explosives may be used or stored only when authorized in writing by the County. Explosives shall be handled, used and stored in accordance with Applicable Laws. When use or storage of explosives or other Hazardous Substances or methods of construction involving use of dangerous materials or equipment are necessary for execution of the Work, Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

**10.2.8 First Aid.** Contractor shall maintain emergency first aid treatment for all workers and other persons on the Project which complies with the Federal Occupational Safety and Health Act of 1970 (29 U.S.C.A. §§651 et seq.) and all other Applicable Laws.

**10.2.9 Unsafe Conditions.** Contractor shall immediately correct any condition that exists on the Site, or that County, in its reasonable judgment, determines to exist on the Site, that is unsafe or potentially unsafe to persons or property.

**10.2.10 Responsibility for Loss.** Contractor shall promptly remedy Loss to any property or person caused in whole or in part by the failure of Contractor, the Subcontractors, of any Tier, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable to fully comply with the requirements of this Article 10, except Loss attributable solely to the negligent acts or omissions of the County, Inspectors of Record, Architect, County Consultants or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, and not attributable, in whole or in part, to the negligence, willful misconduct or violation of Applicable Laws by Contractor or a Subcontractor, of any Tier, or the failure by Contractor to comply with the Contract Documents. The foregoing obligations of Contractor are in addition to and not a limitation upon Contractor's indemnity obligations under Section 3.18, above.

**10.2.11 Loading, Storage.** Contractor shall be responsible for coordinating the storage and staging of materials and equipment on-Site and off-Site and shall not load or store or permit any part of the Work or the Site to be loaded or stored so as to endanger the safety of persons or risk loss or damage to property.

**10.2.12 Emergency.**

**.1 Contractor Responsibility.** In an emergency involving safety or protection of persons or property, Contractor shall act immediately, either at County's direction or as otherwise necessary under the circumstances, to prevent any Loss. In such cases, Contractor shall immediately notify County, which notice may be oral, followed within twenty-four (24) hours after occurrence of the incident by written confirmation of the occurrence of such emergency and Contractor's action in response thereto.

**.2 County Action.** If, in the sole discretion of County, the condition is immediately threatening life or property, County may, with or without notice to Contractor, take whatever immediate action is necessary to correct the life-threatening condition, and the costs thereof, including, without limitation, any fees or costs of Architect, Inspectors of Record, County Consultants or others to whom County may be liable, shall be borne by Contractor at the Contractor's Own Expense.

**10.2.13 No County Responsibility.** Nothing set forth in this Section 10.2 or elsewhere in the Contract Documents shall be interpreted as an assumption of any responsibility on the part of County or other persons or entities other than the Contractor and the Subcontractors, to report such conditions to Contractor nor as relieving Contractor of any of its responsibilities under the Contract Documents.

**10.2.14 Separate Contractors.** With respect to work of a Separate Contractor being performed within an area of the Site that is under the responsibility or control of the Contractor, Contractor shall: (1) provide copies of the Safety Program to the Separate Contractors and advise the Separate Contractors of the areas of the Site to which the Safety Program applies and where compliance with the Safety Program is expected; (2) protect the Separate Contractors' work and workers from Loss due to the actions or inactions of Contractor and the Subcontractors; and (3) notify the Separate Contractor and County of any observed violation by the Separate Contractor of the Safety Program or of any violations by the Separate Contractor of Applicable Laws governing safety on the Site. Nothing herein shall be interpreted as relieving the Separate Contractors from their obligations to comply with the Contractor's Safety Program, as excusing any failure by a Separate Contractor from performing its obligations under its contracts with County or Applicable Laws or as obligating Contractor to directly supervise or enforce the obligations of the Separate Contractors to comply with the requirements of the Safety Program or Applicable Laws relating to safety.

### 10.3 HAZARDOUS SUBSTANCES, MOLD

#### 10.3.1 Hazardous Substances.

##### **.1 On Site Conditions.**

**(1) Existing Conditions.** In the event Contractor or its Subcontractors encounter materials existing or otherwise present at the Site that are reasonably believed to be Hazardous Substances that have not been rendered harmless, Contractor and Subcontractors shall, except in cases where the removal, encapsulation or abatement of such Hazardous Substances is indicated by the Contract Documents to be part of the Work to be performed by Contractor, immediately stop Work in the area affected and report the condition to County in writing. Contractor and Subcontractors shall continue Work in unaffected areas reasonably believed safe. County shall then promptly arrange for the sampling, testing and profiling of such suspected Hazardous Substances to confirm the nature, quantity or concentration thereof. In the event that such suspected Hazardous Substances are determined not to be Hazardous Substances or to be Hazardous Substances but not of sufficient nature, quantity or concentration to trigger handling and manifesting of the same as a hazardous waste upon disturbance and removal, then Contractor and its Subcontractors shall, without any Contract Adjustment, be obligated to resume the portion of the Work that was suspended and shall proceed to handle and dispose of such materials pursuant to the Contract Documents, taking all reasonable precautions that are applicable under the circumstances. If, alternatively, the suspected Hazardous Substances are determined to be Hazardous Substances of sufficient nature, quantity or concentration to trigger handling and manifesting of the same as hazardous waste upon disturbance and removal, the parties shall determine what, if any, action to take with respect to such Hazardous Substances, whether to resume Work with respect to such Hazardous Substances, taking all reasonable precautions that are applicable under the circumstances, and what, if any, Contract Adjustment is appropriate and mutually agreed in order to account for any increased cost of, or Delay in connection with, handling or disposal of Hazardous Substances not already contemplated and provided for in the Contract Documents.

(2) **Contractor Release.** Contractor and its Subcontractors shall not cause the discharge, release, emission, spill, storage, treatment or disposal of any Hazardous Substance on or adjacent to the Site, except as required and permitted by the Contract Documents and Applicable Laws in connection with Contractor's performance of an obligation to remove Hazardous Substances as part of the Work agreed to be performed under the Contract Documents or as otherwise required under the provisions of this Subparagraph 10.3.1.1. Should Contractor or its Subcontractors discharge, release, emit, spill, treat, store or dispose of any Hazardous Substance on the Site in violation of the foregoing obligation or otherwise in violation of Applicable Laws, Contractor shall at Contractor's Own Expense and without limitation to County's other rights or remedies for default immediately (a) inform County in writing of such event, (b) advise County with respect to any release reporting or notification requirement that may apply as a result of such event, (c) assist County in complying with any such reporting or notification requirement as determined by County, and (d) perform any investigation, remediation, removal or other response that is necessary or desirable in order to abate or clean up the condition resulting from such event to the full satisfaction of County and any applicable Governmental Authority. Such Hazardous Substances shall be removed and properly disposed of as soon as they can be accepted at an appropriate disposal facility, and in no event later than sixty (60) Days after such waste is generated, unless a longer time is approved by County.

**.2 Remediation by Contractor.**

(1) **Application.** The provisions of this Paragraph 10.3.1.2 shall apply only if the Work to be performed by Contractor includes within its scope the removal, abatement, moving, handling, containment, disposal or transport of Hazardous Substances

(2) **Advance Submissions to County.** Before Contractor or any of its Subcontractors moves, removes, or transports Hazardous Substances to a facility for the receipt, treatment, storage or disposal of the Hazardous Substances ("Hazardous Substances Facility"), Contractor shall cause the person or entity who will be moving, removing or transporting the Hazardous Substances to provide to County the following: (a) verification of the Hazardous Substance Facility's or other transporter's licensed status to haul such materials; (b) verification of the Hazardous Substance Facility's licensed status, including a current permit to receive the specific materials to be transported there; (c) certification that the Hazardous Substance Facility is not under enforcement action by the U.S. Environmental Protection Agency ("EPA") or applicable State Governmental Authority or listed on any applicable EPA or applicable State Government Authority list of violating facilities; (d) verification of the Hazardous Substances Facility's EPA Identification Number (if applicable); and (e) original executed letter(s) of indemnity from the Hazardous Substances Facility bearing the Hazardous Substance Facility's letterhead. Contractor further warrants that the selected Hazardous Substance Facility is appropriately licensed and permitted to store, treat and dispose of Hazardous Substances waste in connection with the Work.

(3) **Contractor Responsibility.** Contractor warrants that it is aware of and understands the hazards which are presented to persons, property and the environment in performance of the transportation, storage and disposal of the Hazardous Substances described in the Contract Documents. Contractor and its Subcontractors and agents shall be responsible for the following: (a) processing the application for, and receiving on behalf of the County or appropriate entity, an EPA or state-equivalent generator identification number (if required); (b) preparing manifests and other shipping documents; (c) making all necessary arrangements (after consultation with County) for any off-Site transportation, treatment, storage and disposal of such Hazardous Substances in accordance with Applicable Laws; (d) ensuring the proper and lawful transportation and disposal of such Hazardous Substances, even if such services are performed by other entities under contract with Contractor or its Subcontractors; and (e) taking any necessary actions to ensure such proper transport and disposal in the event of any contingency, such as the rejection of the Hazardous Substances as nonconforming by any waste disposal facility. Contractor shall promptly provide to County copies of all manifests and other shipping documents confirming the receipt and proper disposal of all Hazardous Substances at the Hazardous Substances Facility, even if such services are performed by other entities under contract with Contractor or its Subcontractors.

(4) **Reporting Requirements.** Contractor shall comply with any Hazardous Substances release reporting requirements to Governmental Authorities directly applicable to Contractor. Notice of such reporting must be provided in advance to County or concurrently in the event of an emergency.

(5) **Samples.** Contractor and its Subcontractors shall retain all media samples for the longer of (a) the longest holding period specified in any federal, state or local laboratory analytical procedures or

guidance for the analyses performed; or (b) three months for soil samples and thirty (30) Days for water samples. Further storage or transfer of samples will be made at County's expense upon County's written request of Contractor. Contractor shall require by contract that each and every Subcontractor and agent of Contractor or a Subcontractor who performs testing of samples in connection with the Work properly disposes of such samples in accordance with Applicable Laws after completion of testing and notice to County. Regarding any such samples which may remain on-Site, provided County has approved of such on-Site storage in advance, County agrees to pay all costs associated with the storage, transport, and disposal of such samples.

**(6) Verification.** Upon Final Completion of the Work, Contractor shall confirm to County in writing that: (a) all Hazardous Substances specified for removal in the Contract Documents have been removed; and (b) all Hazardous Substances wastes removed from the Site as part of the Work have been disposed of in accordance with this Subparagraph 10.3.1.2 and Applicable Laws in a Hazardous Substances Facility.

**10.3.2 Mold.** Contractor is responsible to immediately notify County in writing if any conditions in the construction materials incorporated or to be incorporated into the Work or present in Existing Improvements are encountered at the Site that Contractor or any Subcontractor knows or, in the exercise of due care of a Contractor and not that of a consultant with special or technical expertise in the subject of Mold, should know indicate the presence of Mold or if untreated are likely to result in the growth of Mold. Contractor shall thereafter take such precautions as are reasonably required to prevent the exposure of persons to such conditions until they have been evaluated. Except as otherwise authorized by the Contract Documents or as are usual and customary according to prevailing standards of the construction industry in the vicinity of the Project, Contractor shall not allow water or moisture to come into contact with materials in Existing Improvements or with materials located at the Site that are incorporated or to be incorporated into the Work and if such contact occurs, the areas affected shall be inspected by Contractor, using appropriate consultants experienced in testing and evaluating Mold, for the presence of Mold and evaluated for the potential of future growth of Mold. All portions thereof that are found to indicate the presence of Mold, or that are found to be in a condition that has the potential for becoming a source of Mold, shall be removed and replaced. Costs incurred by Contractor due to its failure to perform its obligation under this Paragraph 10.3.2 shall be borne by Contractor at Contractor's Own Expense.

**10.3.3 Release of County.** Contractor assumes the risk that its employees or the employees of its Subcontractors, and other persons that they cause or permit to be present on the Site, may be exposed to known or unknown Hazardous Substances or Mold. Under no circumstances shall County be liable for, and Contractor hereby fully and unconditionally releases County and the other Indemnitees from, and agrees to defend and indemnify County and the other Indemnitees on the terms set forth in Section 3.18, above, against, any and all known and unknown Losses resulting from or relating to the exposure of any employee of Contractor or its Subcontractors, or other person that they cause or permit to be present on the Site, to: (1) Hazardous Substances or Mold encountered in connection with or as a result of the performance of the Work, or (2) Hazardous Substances or Mold not necessarily encountered in connection with the performance of the Work, but to which any of them may nevertheless be exposed as a result of their being present on the Site.

**10.3.4 Communications with Governmental Authorities.** Contractor shall provide to County copies of all written communications with Governmental Authorities or others relating to Hazardous Substances or Mold (other than privileged communications); provided, however, that non-disclosure of privileged communications shall not limit Contractor's obligation to otherwise comply with the terms of the Contract Documents, including, without limitation, this Section 10.3.

**10.3.5 Subcontractors.** Contractor shall include provisions in all contracts it enters into with Subcontractors for the Work requiring them to assume toward Contractor and County the same obligations that Contractor assumes toward County under this Section 10.3. Contractor shall require the Subcontractors to ensure that such provisions are included in all contracts they enter into with all lower-Tier Subcontractors.



## ARTICLE 11 INSURANCE

### 11.1 INSURANCE

11.1.1 **Contractor's Insurance Requirements.** Without limiting or diminishing any of the Contractor's obligations to defend, indemnify or hold the County harmless as set forth elsewhere in the Contract Documents, Contractor shall procure and maintain or cause to be maintained throughout the performance of the Work and for the duration of any guarantee or warranty provided under the Contract Documents, at Contractor's Own Expense, the following insurance coverages:

**.1 Workers' Compensation.** If the Contractor has "employees", as defined by the State of California, the Contractor shall provide a policy of statutory Workers' Compensation Insurance (Coverage A) as prescribed by the laws of the State of California. Such policy shall include Employers' Liability (Coverage B) including Occupational Disease with limits not less than \$1,000,000 per person per accident. Such policy shall be endorsed to waive subrogation in favor of the County and, if applicable, to provide a Borrowed Servant/Alternate Employer Endorsement. Pursuant to §3700 of the California Labor Code, Contractor shall file with the County before commencing the Work the following signed certification:

*"I am aware of the provisions of Section 3700 of the Labor Code, which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that Code, and I shall comply with such provisions before commencing the performance of the Work of this Construction Contract."*

**.2 Commercial General Liability.** Contractor shall provide a policy of Commercial General Liability insurance coverage, including but not limited to, premises liability, contractual liability, products and completed operations liability, personal and advertising injury, and cross liability coverage, covering claims which may arise from or out of Contractor's performance of its obligations hereunder. Such policy shall name the County, its agencies, districts, special districts and departments, and their respective directors, officers, elected or appointed officials, agents, employees and representatives, including, without limitation, the members of the Board of Supervisors, and all other Indemnitees, as "additional insureds" and contain a waiver of subrogation in favor of the County and all other such additional insureds. Such policy's limit of liability shall not be less than \$1,000,000 per occurrence combined single limit. If such policy contains a general aggregate limit, it shall apply separately to the Construction Contract or be no less than two (2) times the occurrence limit.

**.3 Vehicle Liability.** If vehicles or mobile equipment are used in the performance of the Work or other obligations under the Contract Documents, then Contractor shall provide a policy of liability insurance coverage for all owned, non-owned or hired vehicles so used in an amount not less than \$1,000,000 per occurrence combined single limit. If such policy contains a general aggregate limit, it shall apply separately to the Construction Contract or be no less than two (2) times the occurrence limit. Such policy shall name the County, its agencies, districts, special districts and departments, and their respective directors, officers, elected or appointed officials, agents, employees and representatives, including, without limitation, the members of the Board of Supervisors, and all other Indemnitees, as "additional insureds" and contain a waiver of subrogation in favor of the County and all other such additional insureds.

**.4 Property (Physical Damage).** Contractor shall provide a policy of all-risk property insurance coverage for the full replacement value of all Contractor's equipment, improvements/alterations, temporary structures, and systems, including without limitation, items owned by others in the Contractor's care, custody or control, used on the Site or other County-owned property, or used in any way connected with the performance of the Work.

**.5 Builder's All Risk (Course of Construction) Insurance.** The Bid Form utilized by Contractor to prepare its Bid states whether the Contractor shall include Builder's All Risk (Course of Construction) Insurance for the Project. If the Bid Form states that such insurance shall be included by the Bidder in its Bid, then Contractor shall provide a policy of Builder's All Risk (Course of Construction) insurance coverage including (if the Work is located in an earthquake or flood zone or if required on financed or bond financing arrangements) coverage for earthquake and flood, covering the County, Contractor and every Subcontractor, of every Tier, for the entire Project, including property to be used in the construction of the Work while such property is at off-Site storage locations or while in transit or temporary

off-Site storage. Such policy shall include, but not be limited to, coverage for fire, collapse, faulty workmanship, debris removal, expediting expense, fire department service charges, valuable papers and records, trees, grass, shrubbery and plants. If scaffolding, falsework and temporary buildings are insured separately by the Contractor or others, evidence of such separate coverage shall be provided to County prior to the start of the Work. Such policy shall be written on a completed value form. Such policy shall also provide coverage for temporary structures (on-Site offices, etc.), fixtures, machinery and equipment being installed as part of the Work. Contractor shall be responsible for any and all deductibles under such policy. Upon request by County, Contractor shall declare all terms, conditions, coverages and limits of such policy. NOTWITHSTANDING THE FOREGOING, COUNTY RETAINS THE RIGHT EXERCISED AT ANY TIME PRIOR TO AWARD TO ELECT TO USE ITS OWN BUILDER'S ALL RISK (COURSE OF CONSTRUCTION) INSURANCE and in the event County so elects to deduct the price for such insurance that is stated in Contractor's Bid, or if not so stated the amount included by Contractor for such insurance in the preparation of the Contractor's Bid, from the Contract Price by means of a Contract Adjustment pursuant to Change Order or Unilateral Change Order. If the County so provides the All Risk (Course of Construction) insurance for the Project, then Contractor shall assume the cost of any and all applicable policy deductibles (currently, \$50,000 per occurrence) and shall insure its own machinery, equipment, tools, etc. from any loss of any nature whatsoever.

**11.1.2 Other Mandatory Insurance Requirements.** The Contractor shall comply with the following requirements, which shall be deemed applicable to all carriers and insurance policies provided pursuant to Paragraph 11.1.1, above:

**.1 Insurer Rating.** Any and all insurance carrier(s) providing insurance coverage under any and all policy(ies) of insurance provided by Contractor pursuant to Paragraph 11.1.1, above, shall be admitted to the State of California and have an A M BEST rating of not less than A: VIII (A:8) (unless such requirements are waived in writing by the County Risk Manager, and if the County's Risk Manager waives such requirement for a particular insurer such waiver is only valid for that specific insurer and only for one policy term);

**.2 Self Insured Retentions.** Contractor shall advise County in writing the dollar amount of any "self insured retention" maintained by the Contractor that exceeds \$500,000 per occurrence. Each such self insured retention must have the prior written consent of the County Risk Manager before the commencement of any Work or operations or activities relating to the Work. If Contractor is notified that a self insured retention is unacceptable to the County, then at the election of the County, exercised in the County's sole and absolute discretion, by means of the written approval of the County's Risk Manager, the insurance carriers affected shall either: (1) reduce or eliminate such self-insured retention as respects the Construction Contract; or (2) procure a bond, satisfactory to County and approved by County in writing, which guarantees payment of losses and related investigations, claims administration, and defense costs and expenses.

**.3 Evidence of Insurance.** Contractor shall cause Contractor's insurance carrier(s) to furnish to the County either: (1) properly executed original certificate(s) of insurance and certified original copy(ies) of endorsement(s) effecting the coverage(s) required by this Section 11.1, or (2) if requested to do so orally or in writing by the County Risk Manager, provide original, certified copy(ies) of policy(ies) including all endorsement(s) and all attachment(s) thereto, showing such insurance is in full force and effect. Such certificate(s) and all policies of insurance provided by Contractor pursuant to this Section 11.1 shall contain the covenant of the insurance carrier(s) that thirty (30) Days' written notice shall be given to the County prior to any material modification, cancellation, expiration or reduction in coverage of such insurance. Each certificate of insurance and endorsement shall be signed by an individual expressly authorized by the insurance carrier to do so on the carrier's behalf. Contractor shall, if requested, provide written proof of such authorization. ***Contractor shall not commence any Work or any activities or operations related to the performance of the Work unless and until Contractor has complied with all of the requirements of this Section 11.1.***

**.4 Modification, Cancellation, Changes in Limits.** A material modification, cancellation, expiration, or reduction in coverage, shall constitute an Event of Contractor Default for which County shall have right, without limitation to its other rights or remedies provided for in the Contract Documents or under Applicable Laws, to terminate this Construction Contract. Such Event of Contractor Default may only be deemed cured if the County receives, prior to the effective date of such material modification, cancellation, expiration or reduction in coverage, properly executed original certificate(s) of insurance and original, certified copy(ies) of policy(ies) and endorsement(s), including all attachment(s) thereto, evidencing that the coverage(s) required by this Section 11.1 is(are) and will

continue, without any gap in coverage, in full force and effect in accordance with all of the requirements of this Section 11.1

**.5 Primary Coverage.** It is understood and agreed to by County and Contractor that the Contractor's insurance coverage(s) provided under this Section 11.1 shall be construed as primary insurance, and the County's insurance and/or deductibles and/or self-insured retentions or self-insured programs shall not be construed as contributory.

**.6 Additional Coverages.** County reserves the right to modify, adjust, add to and/or increase the types, amounts and terms of any insurance required under this Section 11.1 if the County Risk Manager determines, in the exercise of his/her sole and absolute discretion, that the type, amount or terms of the insurance required by this Section 11.1 has(have) become inadequate or that additional risk or exposure exists (such as, without limitation, the use of aircraft, watercraft, cranes, etc.) due to: (1) a Change in the Work; (2) the period of time of Contractor's actual performance of the Work continuing for longer than five (5) years from the Date of Commencement, whether due to Contract Adjustment or for any for any other reason; or (3) other circumstances not reasonably foreseeable to County.

**.7 Subcontractors.** Contractor shall include provisions in its subcontracts requiring each Subcontractor to assume an obligation toward Contractor to furnish insurance that complies with all of the requirements of this Section 11.1 as apply to Contractor's insurance provided to Owner and requiring such Subcontractors to furthermore include provisions in their contracts with lower-Tier Subcontractors likewise requiring such lower Tier Subcontractors assume the same obligations for providing such insurance and for passing through all such obligations to all lower Tier Subcontractors.

**.8 Self-Insurance.** If approved by County, in the exercise of its sole and absolute discretion, the insurance requirements contained in this Section 11.1 may be met with a program(s) of self-insurance provided that such program has been submitted to County and approved in writing by County prior to commencement of the Work or of any activity or operation related to the performance of the Work.

**.9 Notice of Claim.** Contractor agrees to notify County of any claim by a third party or any incident or event that may give rise to a claim arising from the performance of the Work.

## ARTICLE 12 BONDS

### 12.1 PERFORMANCE BOND AND PAYMENT BOND

**12.1.1 Performance and Payment Bonds.** Within ten (10) Days after the issuance of the Notice of Intent to Award and prior to commencing Work, Contractor shall deliver to County a good and sufficient labor and materials payment bond ("Payment Bond") and a good and sufficient performance bond ("Performance Bond"), each in the amount of one hundred percent (100%) of the Contract Price.

**12.1.2 Changes.** The penal amounts of the Performance Bond and Payment Bond shall be increased on account of Change Orders and Unilateral Change Orders increasing the Contract Price. If requested by County, Contractor shall deliver to County evidence of such increases.

**12.1.3 Replacement.** Should any bond required hereunder or any Surety on such bond become or be determined by County to be insufficient, it shall be replaced within ten (10) Days by a bond that fully complies with the requirements of this Section 12.1.

**12.1.4 Duration.** The Payment Bond shall remain in effect until Acceptance of the Work and all Claims of Contractor and the Subcontractors, of any Tier, have been fully and finally resolved. The Performance Bond shall remain in effect and assure faithful performance of all Contractor's obligations under the Contract Documents, including, without limitation, all warranty obligations.

**12.1.5 Condition of Payment.** No payments to Contractor for Work performed shall be made or due until there has been full compliance with the requirements of this Section 12.1.

12.1.6 **Surety Rating.** Any Surety company issuing the Payment Bond or Performance Bond shall be, at all times while such bond is in effect, an Admitted Surety. The Surety company issuing the Performance Bond shall additionally have at all such times a current A.M. Best rating of A VIII (A:8) or better.

12.1.7 **Premiums.** The premiums for the Performance Bond and Payment Bond are included in the Contract Price and shall be paid by Contractor at Contractor's Own Expense.

12.1.8 **Obligee.** The Performance Bond shall name County as obligee. All performance bonds, if any, purchased by Subcontractors shall name County as a dual obligee with Contractor.

12.1.9 **No Exoneration.** The Performance Bond and Payment Bond shall contain provisions to the effect that Changes, Change Orders, Unilateral Change Orders, Construction Change Directives, Modifications, Changes and Contract Adjustments shall in no way release or exonerate Contractor or its Surety from their obligations and that notice thereof is waived by the Surety.

12.1.10 **Communications.** County shall have the right to communicate with Surety with respect to matters that are related to performance of the Work. Contractor shall be provided with a copy of all such communications that are in writing. Such communications shall not create or be interpreted as creating any contractual obligation of County to Surety.

12.1.11 **No Limitation.** The requirements of this Section 12.1 pertaining to the Performance Bond and the Payment Bond shall be without limitation to any other obligations Contractor may have under Applicable Laws to provide bonding for the benefit of, and to assure payment to the Subcontractors performing the Work for, the Project.

12.1.12 **Subcontractor Bonds.** Each performance bond, if any, furnished by a first-Tier Subcontractor shall include a provision whereby the Surety consents to the contingent assignment of Contractor's rights under such bond to County as provided in Section 5.3, above.

12.1.13 **Claims.** By incorporation of the Construction Contract into the Performance Bond issued by Surety, Surety shall be deemed, subject to the other terms of the Performance Bond, to be bound by all of the obligations assumed by Contractor under the Contract Documents, including, without limitation, bound by any determination, resolution, award or judgment entered or made upon any Claim by or against Contractor.

## ARTICLE 13 UNCOVERING AND CORRECTION OF THE WORK

### 13.1 UNCOVERING OF THE WORK

If a portion of the Work is covered contrary to the request or direction of County, Inspector of Record or Architect, or contrary to the requirements of the Contract Documents, it must, if required by the any of them, be uncovered for observation and be re-covered by Contractor at Contractor's Own Expense.

### 13.2 CORRECTION OF THE WORK

Contractor shall promptly correct Defective Work, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. All such Defective Work shall be either: (1) replaced and all the Work disturbed thereby made good by Contractor at Contractor's Own Expense; or (2) County may exercise its option pursuant to Section 13.4, below, to accept such Work and adjust the Contract Price.

### 13.3 GUARANTEE TO REPAIR PERIOD

13.3.1 **Guarantee To Repair Period.** Besides guarantees and warranties required elsewhere in the Contract Documents, Contractor guarantees the Work as provided hereinbelow. The period of this guarantee, termed the "Guarantee To Repair Period," is for one (1) year commencing as follows:

.1 for any portion of the Work that, upon Substantial Completion of the overall Work, is fully and finally complete and usable in all respects independent of other portions of the Work that are not fully and finally complete, on the date of Substantial Completion of such portion of the Work;

.2 for space beneficially occupied or for separate systems fully utilized prior to Substantial Completion, from the first date of such beneficial occupancy or full utilization, as established by an appropriate written notice by County of intent to take beneficial occupancy; or

.3 for all Work other than that described in Subparagraph 13.3.1.1, above or Subparagraph 13.3.1.2, above, from the date of Final Completion of the Work.

**13.3.2 Repair by Contractor.** Subject to the provisions of Paragraph 13.3.3, below, Contractor shall do the following: (1) correct, repair, replace, remove and restore, to the County's satisfaction, any Defective Work that becomes apparent during the progress of the Work or during the Guarantee To Repair Period; (2) correct, repair, replace, remove and restore, to the County's satisfaction, any other parts of the Work and any other real or personal property which is damaged or destroyed as a result of Defective Work or the correction of Defective Work; and (3) remove from the Site all the Work identified by the County as Defective Work, whether incorporated or not and whether discovered before or after Substantial or Final Completion. Ordinary wear and tear, abuse, or neglect by County or by County employees, its staff, visitors, public or others (except for those under the control or responsibility of Contractor or its Subcontractors) who are authorized or admitted by County to enter, use or occupy the Work, or who enter, use or occupy the Work after Final Completion, are excepted from the foregoing guarantee. All Losses resulting from Defective Work, including, without limitation, all costs of such correction, repair, replacement, removal and restoration, additional testing, inspection and additional service fees and costs of the Inspector of Record, Architect, County Consultants or others whose services may be made necessary thereby as well as any Loss to any other parts of the Work and any other real or personal property which is damaged or destroyed as a result of Defective Work or the correction, repair, replacement, removal or restoration of Defective Work, shall be paid for by Contractor at Contractor's Own Expense. Contractor shall correct, repair, replace, remove and restore Defective Work at such times as are acceptable to the County and in such a manner as to avoid, to the greatest extent practicable, disruption to the activities of the County, its staff, visitors, the public or others. Contractor shall notify the County in writing upon the completion of such correction, repair, replacement, removal and restoration.

**13.3.3 Notice by County.** Except as otherwise provided in this Paragraph 13.3.3 where immediate corrections are needed due to dangerous conditions or risk of imminent Loss or interruption of County operations, the County will give notice to Contractor of Defective Work observed prior to Final Completion in accordance with the provision of Section 15.1, below, governing the occurrence of an Event of Contractor Default and the Contractor shall proceed to cure such Event of Contractor Default in accordance with the requirements of Section 15.1, below, and Paragraph 13.3.2, above. With respect to Defective Work observed after Final Completion, the County will give notice to Contractor with reasonable promptness and Contractor shall commence the correction, repair, replacement, removal and restoration as required by Paragraph 13.3.2, above, no later than ten (10) Days after mailing of such notice to Contractor and Contractor shall thereupon diligently and continuously prosecute such correction, replacement, repair, or restoration to completion. Notwithstanding the foregoing, if in the County's opinion the presence of Defective Work, whether observed prior to Final Completion or after Final Completion and during the Guarantee To Repair Period, poses a risk or threat: (1) to life, safety or the protection of property; (2) of imminent Loss to the County or to any other person or entity; or (3) of causing an interruption in the operations of the County, then County will have the right, in the exercise of its sole and absolute discretion, to proceed with correction or replacement of the Defective Work without prior notice to Contractor, but in such cases will attempt to notify Contractor as soon as possible of the conditions encountered and the action taken by County. Such action by County without prior notice to Contractor shall not relieve Contractor of its responsibility for the costs of such County action or for any Loss occasioned by the Defective Work or necessitated by the County's action, whether such Loss occurs before or after such County action is implemented or completed.

**13.3.4 Correction by County.** If Contractor fails to perform any of its obligations under Paragraph 13.3.2, above, to correct, repair, replace, remove or restore then County, or Separate Contractors under the County's direction, may, notwithstanding any other provisions of this Article 13, proceed to do so and all costs associated therewith (including, without limitation, the cost to store any materials removed) shall be the responsibility of and paid by Contractor at Contractor's Own Expense. Such action by County will not relieve Contractor of the guarantees provided in this Article 13 or elsewhere in the Contract Documents. In addition to Contractor's other obligations under Paragraph 13.3.2, above, Contractor shall correct, repair, replace, remove and restore, to the County's satisfaction and at

Contractor's Own Expense any other parts of the Work and any other real or personal property that are damaged or destroyed as a result of such actions by County or the Separate Contractors.

**13.3.5 Sale.** If Contractor does not pay the costs of, or any of the Losses associated with, the correction, repair, replacement, removal or restoration required by the provisions of Paragraph 13.3.2 through Paragraph 13.3.4, above, then within five (5) Days after notice by the County, County may sell any materials or other items of Work removed at auction or at private sale or otherwise dispose of such materials or items and shall account for the net proceeds thereof, after deducting all such costs and Losses, and all costs of sale. If such net proceeds of sale do not cover the Losses for which Contractor is liable to the County, the County may at its option reduce the Contract Price or any payments due to Contractor by such deficiency or recover such deficiency from Contractor.

**13.3.6 No Limitation.** Contractor's obligations under this Article 13 are in addition to, and not in limitation of, its warranty obligations under Section 3.5, above, and any other obligation, guaranty or warranty of Contractor or any other third party under the Contract Documents. Nothing contained in this Article 13 shall be construed to shorten any periods of limitation with respect to other obligations of Contractor under the Contract Documents that are for longer specified periods. Establishment of the Guarantee To Repair Period in no way limits either Contractor's liability for Defective Work or the time within which proceedings may be commenced to enforce Contractor's obligations under the Contract Documents.

#### **13.4 ACCEPTANCE OF NONCONFORMING WORK**

Notwithstanding any other provisions of the Contract Documents to the contrary, the County shall have the option, exercised in its sole and absolute discretion after notice to Contractor, in lieu of requiring that Defective Work be remedied or corrected, to reduce the Contract Price to reflect the reduced value of the performance received by County. Such option shall be exercised solely by written notice to Contractor and shall not be implied from any act or omission by County. If there are no remaining payments of the Contract Price to be made to Contractor, or if the remaining payments and retention are insufficient to cover the amount of the reduction of the Contract Price, Contractor shall promptly pay to County the amount of any such deficiency.

### **ARTICLE 14 MISCELLANEOUS PROVISIONS**

#### **14.1 GOVERNING LAW**

The interpretation and enforcement of the Construction Contract and other Contract Documents and of the performance by the parties thereunder shall, notwithstanding application of the principles of conflicts of laws, be governed by the laws of the State of California. The Superior Court for the County of Riverside shall have exclusive jurisdiction and venue over any legal proceedings arising out of or involving the interpretation or enforcement of, or other matters relating to, the Construction Contract, the other Contract Documents or the performance of the parties thereunder.

#### **14.2 TIME OF ESSENCE**

All time limits stated in the Contract Documents relative to Contractor's performance of its obligations under the Contract Documents are of the essence.

#### **14.3 SUCCESSORS AND ASSIGNS**

The Construction Contract and other Contract Documents shall be binding on successors, assigns and legal representatives of County and Contractor, respectively. Contractor shall not assign, sublet or transfer an interest in or claim under this Construction Contract without advance written approval of County, which approval may be granted or withheld by County in its sole and absolute discretion, and any assignment, subletting or transfer without written approval by County shall be deemed void from its inception. Any assignment, subletting or transfer, whether or not approved by County, will not release Contractor from any of its obligations under the Contract Documents to County. County shall have the right to assign, sublet or transfer its interest in or any claim under the Construction Contract upon written notice to Contractor.

#### 14.4 WRITTEN NOTICE

Any notice from one party to the other or otherwise under the Contract Documents shall be in writing and shall be dated and signed by the party giving such notice or by a duly authorized representative of such party. Any such notice shall be deemed to have been duly served if served in the following manner, and in accordance with Civil Code §8100 et seq.:

**14.4.1 Notice to County.** If notice is given to County: (1) by personal delivery thereof to County; or (2) by depositing same in United States mail, enclosed in a sealed envelope addressed to County at Facilities Management, 3133 Mission Inn Avenue, Riverside CA 92507, and to such other address as set forth in the Bidding Documents as the location for submission of Bids and sent by registered or certified mail with postage prepaid, or express mail or overnight delivery by an express mail carrier; or (3) by leaving the notice and mailing a copy in the manner provided in Code of Civil Procedure §415.20.

**14.4.2 Notice to Contractor.** If notice is given to Contractor: (1) by personal delivery thereof to Contractor; or (2) by depositing same in United States mails, enclosed in a sealed envelope addressed to Contractor at its address stated in the Construction Contract, or if none is so stated at the address on the records of the Contractor's State License Board and sent by registered or certified mail with postage prepaid or express mail or overnight delivery by an express mail carrier; or (3) by leaving the notice and mailing a copy in the manner provided in Code of Civil Procedure §415.20.

**14.4.3 Notice to Claimant.** If notice is given to a claimant as defined in Civil Code §8004: (1) by personal delivery thereof to claimant; or (2) by depositing same in United States mail, enclosed in a sealed envelope addressed to claimant at its address stated in: a preliminary notice, stop payment notice, or claim against a payment bond; or on the records of the Contractor's State License Board; and sent by registered or certified mail with postage prepaid or express mail or overnight delivery by an express mail carrier; or (3) by leaving the notice and mailing a copy in the manner provided in code of Civil Procedure §415.20.

**14.4.4 Notice to Surety.** If notice is given to the Surety: (1) by personal delivery to the Surety; or (2) by depositing same in United States mail, enclosed in a sealed envelope, addressed to the Surety at the address of the Surety shown in the applicable Performance Bond or Payment Bond, or if none is shown, the address on the records of the Department of Insurance, and sent by registered or certified mail with postage prepaid or express mail or overnight delivery by an express mail carrier; or (3) by leaving the notice and mailing a copy in the manner provided in Code of Civil Procedure §415.20.

#### 14.5 RIGHTS AND REMEDIES

**14.5.1 County Rights.** Rights and remedies available to the County under the Contract Documents are in addition to and not a limitation of County's rights and remedies otherwise available under other provisions of the Contract Documents or Applicable Laws.

**14.5.2 Writing Required.** Provisions of the Contract Documents may be waived by County only in writing signed by the Director stating expressly that it is intended as a waiver of specified provisions of the Contract Documents.

**14.5.3 Subsequent Breach.** A waiver by either party of any breach of any term, covenant, or condition contained in the Contract Documents shall not be deemed to be a waiver of any subsequent breach of the same or any other term, covenant, or condition contained therein whether of the same or a different character.

#### 14.6 NO NUISANCE

Contractor shall not maintain, commit or permit the maintenance or commission of any nuisance in connection with the performance of Work.

#### 14.7 EXTENT OF AGREEMENT

The Contract Documents represent the full and complete understanding of every kind or nature between the parties and all preliminary negotiations and prior representations, proposals and contracts, of whatever kind or nature, are merged herein and superseded hereby. No verbal agreement or implied covenant shall be held to vary the provisions of the Contract Documents. Any modification of this Construction Contract or the other Contract Documents will be effective only by written instrument signed by both County and Contractor and shall, if required by Applicable Laws, be formally approved or ratified by the Board of Supervisors.

#### 14.8 NO THIRD-PARTY RIGHTS

Nothing contained in the Construction Contract or the other Contract Documents is intended to make any person or entity who is not a signatory to this Construction Contract a third-party beneficiary of any right of Contractor (including, without limitation, any right of Contractor to a benefit derived from, or to the enforcement of, an obligation assumed by County) that is expressly or impliedly created by the terms of the Contract Documents or by operation of Applicable Laws.

#### 14.9 SEVERABILITY

Should any part, term, portion or provision of the Construction Contract or the other Contract Documents, or the application thereof to any party or circumstance, be held to be illegal, invalid or in conflict with Applicable Laws, or otherwise be rendered unenforceable or ineffectual, the validity of the remaining parts, terms, portions or provisions, or the application thereof to any other party or circumstances, shall be deemed severable and the same shall remain enforceable and valid to the fullest extent permitted by Applicable Laws.

#### 14.10 PROVISIONS REQUIRED BY APPLICABLE LAWS

Each and every provision of law and clause required by Applicable Laws to be inserted in the Construction Contract or other Contract Documents shall be deemed to be inserted in the Contract Documents shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted or if inserted and requires correction, then upon request of either party these General Conditions shall forthwith be amended by the parties to the Construction Contract to make such insertion or correction.

#### 14.11 SURVIVAL

All provisions of the Contract Documents that either expressly, or by their nature, require performance or assumption by Contractor of an obligation that extends beyond termination of the Construction Contract or Final Completion of the Work, including, without limitation, Contractor's obligations of, or relating to, indemnification, insurance, ownership of documents, retention and audit of books and records, warranties and guaranties and resolution of Claims shall be deemed to survive either termination of the Construction Contract or Final Completion of the Work.

#### 14.12 FEDERAL GRANTS

In the event of a federal grant or other federal financing participation in the funding of the Project, Contractor shall, as required in connection with, or as a condition to, such federal grant or other federal financing participation, permit access to and grant the right to examine its books covering its services performed and expenses incurred under the Construction Contract or other Contract Documents by the federal agency and comply with all applicable federal agency requirements including, without limitation, those pertaining to work hours, overtime compensation, non-discrimination, and contingent fees.

#### 14.13 PROHIBITED INTERESTS

Contractor agrees not to accept any employment or representation which will, or is likely to, make Contractor "financially interested" (as provided in California Government Code §§1090 and 87100, hereinafter "financially interested") in any decision made by County on any matter in connection with which Contractor has been retained in connection with the Project. Without limitation to the foregoing, transactions and interests prohibited by this Section 14.13 include the



following: (1) no official or employee of County who is authorized in such capacity and on behalf of County to negotiate, make, accept, or approve, or to take part in negotiating, making, accepting or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with construction of the Project, shall become directly or indirectly financially interested in the performance of the Construction Contract or in any part thereof; (2) no officer, employee, architect, attorney, engineer or inspector of or for County who is authorized in such capacity and on behalf of County to exercise any executive, supervisory or other similar functions in connection with Construction Contract or in any part thereof; and (3) Contractor shall receive no compensation hereunder, and shall repay County for any compensation received by Contractor hereunder, should Contractor or any of the Subcontractors aid, abet or knowingly participate in violation of this Section 14.13.

#### 14.14 ASSIGNMENT OF ANTI-TRUST ACTIONS

California Public Contract Code §7103.5(b), which is hereby incorporated by this reference, provides:

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

Contractor for itself and all the Subcontractors agrees to assign to County all rights, title and interest in and to all such causes of action Contractor and all the Subcontractors may have in connection with purchases related to or under the Contract Documents. This assignment shall become effective at the time County tenders Final Payment to Contractor, and Contractor shall require assignments from all the Subcontractors to comply herewith.

#### 14.15 NO WAIVER

County's approval, acceptance, use or payment for any or part of Contractor's performance of the Work shall not in any way alter Contractor's obligations, or waive any of County's rights, under Contract Documents.

#### 14.16 CONSENT TO PHOTOGRAPHING

Contractor is advised that County intends, from time to time, to take photographs, videotapes and/or motion pictures of the Work, and workers located on the Site and proximate settings. Contractor consents to the use of Contractor's name and likeness in instructional or training uses, news releases, advertising and/or publicity throughout the world in perpetuity, in all media now known or hereafter invented. Contractor shall include in its contracts with its Subcontractors a consent by the Subcontractor to the use of Subcontractor's name and the likenesses of its employees on the same terms as provided for herein applicable to such consent by Contractor.

### ARTICLE 15 DEFAULT, TERMINATION AND SUSPENSION

#### 15.1 COUNTY REMEDIES FOR DEFAULT

15.1.1 **Event of Default.** Each and any of the following shall be considered an Event of Contractor Default:

- .1 Contractor files a petition, or has filed against it a petition, for bankruptcy or is adjudged bankrupt;
- .2 Contractor makes a general assignment for the benefit of its creditors;
- .3 a receiver is appointed on account of Contractor's insolvency;

.4 Contractor defaults, by failing or refusing to perform any obligation set forth in the Construction Contract, General Conditions or elsewhere in the Contract Documents (including, without limitation, the performance or installation of Defective Work) and thereafter: (1) fails to commence to cure such default within two (2) working days after receipt of written notice of default; (2) if the default can be cured within three (3) Days, Contractor fails or refuses after commencing to cure in accordance with Clause (1) hereof to fully cure such default within three (3) Days after receipt of written notice of default; or (3) if the default cannot be fully cured within three (3) Days, Contractor fails after commencing to cure in accordance with Clause (1) hereof to diligently and continuously prosecute and fully cure such default within ten (10) Days after receipt of such written notice;

.5 Contractor fails or refuses to perform an obligation set forth in the Construction Contract, General Conditions or other Contract Documents that either (1) cannot be cured, or (2) cannot be cured within the 10-Day cure period set forth in Subparagraph 15.1.1.4, above;

.6 a breach of any other agreement between County and Contractor as provided in Paragraph 15.1.9, below; or

.7 if Contractor was previously prequalified as a condition for its bidding the Project pursuant to a Prequalification conducted by County, Contractor's prequalification status has been revoked or cancelled due to any of the following: (1) receipt by County of new information indicating that a statement made in Contractor's Prequalification Submittal (as defined in the Prequalification Documents) was false or misleading; (2) ownership of 50% or more of the stock or assets Contractor has changed; (3) if Contractor is a Project Joint Venture, its Principal Managing Partner (as those terms are defined in the Prequalification Documents) has ceased to function, or fully function, in the capacity of a Principal Managing Partner; or (4) Contractor has failed to comply with the requirements of the Prequalification Documents pertaining to minimum safety Prequalification requirements for Subcontractors.

**15.1.2 County's Remedies.** Without limitation to the County's other rights or remedies under the Contract Documents or Applicable Laws, if there is an Event of Contractor Default, County shall have the right to exercise any one or more of the following remedies:

.1 **Take Over Work.** County may, without terminating the Construction Contract and without incurring any additional liability or responsibility to Contractor (including, without limitation, any obligation to agree to a Contract Adjustment for any portion of the taken-over or non-taken-over Work), take over and perform, or engage others to perform, all or a portion of the Work.

.2 **Suspend Work.** County may, without terminating the Construction Contract and without incurring any additional liability or responsibility to Contractor (including, without limitation, any obligation to agree to a Contract Adjustment for any portion of the suspended or non-suspended Work), suspend Contractor's performance of all or a portion of the Work for as long a period of time as the County determines, in its sole discretion, is appropriate.

.3 **Termination.** County may, without incurring any additional liability or responsibility to Contractor, terminate the Construction Contract, the Work or any portion thereof.

.4 **Surety.** If there is an Event of Contractor Default pursuant to any of Subparagraphs 15.1.1.1 through 15.1.1.5, above, County may, with or without terminating the Construction Contract and without incurring any additional liability or responsibility to Contractor or Surety (including, without limitation, any obligation to agree to a Contract Adjustment), exercise its rights under the Performance Bond furnished by Contractor by giving Surety ten (10) Days' written notice of demand to perform; provided, however, that if the Surety fails, within seven (7) Days after receipt by Surety of written demand, to deliver to the County written notice of its unconditional intention to perform or does not commence performance of the Work within ten (10) Days from receipt of such notice of demand, the County may, at Contractor's Own Expense and/or the expense of the Surety, and with or without terminating the Construction Contract, proceed to complete the Work by any other means County deems expedient. By executing its Performance Bond incorporating the terms of the Construction Contract, Surety shall be deemed to have agreed, without limitation, to the provisions of this Paragraph 15.1.2 as constituting a binding obligation of Surety under its Performance Bond that shall control over any conflicting provisions set forth in the Performance Bond. Neither delivery by Surety of such written notice of unconditional intention to perform nor its timely performance of the Work in accordance with the terms of the Contract Documents and Performance Bond shall constitute waiver by Surety of any rights it may have under the Performance Bond and Applicable Laws to limit its liability to the penal amount of the Performance Bond.

**15.1.3 Contractor Tools, Equipment.** Upon County's exercise of one or more of its remedies following an Event of Contractor Default, County shall have the right, but not the obligation, to perform or complete all or any portion of the Work using any means that County may deem expedient, including, without limitation, taking possession and utilization of any or all of the materials, equipment, appliances, tools, plant and other property not owned by Contractor that are on the Site for County's use in performing the Work.

**15.1.4 Contractor Obligations.** Upon exercise by County of its remedies following an Event of Contractor Default, Contractor shall, unless County directs in writing otherwise, do the following:

- .1 immediately discontinue performance of the Work to the extent specified in writing by County;
  - .2 remove no materials, equipment or tools (other than those owned by Contractor and not necessary for performance of a portion of the Work not terminated or discontinued) from the Site unless directed to do so by County and take all actions necessary or appropriate, or that the County may direct in writing, for the protection and preservation of the Work, any materials, equipment or tools at the Site and any materials or equipment in transit to the Site;
  - .3 place no further orders or subcontracts for materials, equipment, services or facilities, except as may be necessary for Contractor to continue performance of such portion, if any, of the Work that is not discontinued or terminated by County in its written notice;
  - .4 provide to the County, in writing, no later than two (2) Days after request by County, a statement listing or providing: (1) all subcontract agreements, purchase orders and contracts that are outstanding, as well as any change orders, amendments and modifications thereto; (2) the status of invoicing, payments and balance owing under each such subcontract agreement, purchase order and contract; (3) the status of performance and any claims asserted under each such subcontract agreement, purchase order and contract; and (4) providing such other information as the County may determine to be necessary in order to decide whether to accept assignment of any such subcontract agreement, purchase order or contract;
  - .5 promptly following and in accordance with County's written direction: (1) assign to the County or its designee those subcontract agreements, purchase orders or contracts, or portions thereof, that the County elects in writing to accept by assignment; (2) cancel, on the most favorable terms reasonably possible, any subcontract agreement, purchase order or contract, or portion thereof, that the County does not elect to accept by assignment; and (3) if requested by County, settle, with the prior written approval of County of the terms of settlement, outstanding liabilities to Subcontractors with respect to the Work terminated or discontinued;
  6. not terminate any insurance required by the Contract Documents;
  7. thereafter continue only such performance as may be directed by County;
  8. deliver to the County the documents required to delivered pursuant to Paragraph 1.3.6, above;
- and
9. at the written request and option of County, exercised in its sole discretion, deliver to the County, and transfer title to the County of, any completed items, materials, products, equipment or other unincorporated parts of the Work that have not been previously delivered to the Site.

#### **15.1.5 Accounting and Payment**

##### **.1 Full Termination or Discontinuance.**

**(1) Further Payment.** In the event an exercise by County of any of its remedies following an Event of Contractor Default results in a termination or discontinuance of the entire Work, then no further payment shall be due to Contractor for the Work until an accounting has been conducted in accordance with this Paragraph 15.1.5.

(2) **Time for Accounting.** Within forty-five (45) Days after Final Completion of the Work by Contractor, Surety, County or others at request of County, an accounting shall be made pursuant to this Paragraph 15.1.5 of the amount due to Contractor or County.

(3) **Payment Amount.** If, based on the accounting conducted pursuant to this Paragraph 15.1.5, the Contractor Amount exceeds the County Amount, then the difference shall be paid by County to Contractor within fifteen (15) Days after demand by Contractor following completion of such accounting. If the County Amount exceeds the Contractor Amount, then the difference shall be paid by Contractor to County within fifteen (15) Days after demand by County following completion of such accounting. Payment by Contractor of the amount due to County pursuant to such accounting shall not be construed as a release of Contractor's obligation to County for, or County's right to recover from Contractor, any Losses, of any kind whatsoever, not part of the calculation of the County Amount (including, without limitation, additional Losses related to circumstances that formed the basis for calculation of the County Amount) that may be then or thereafter owing to or recoverable by County under Applicable Laws or the Contract Documents.

(4) **Contractor Amount.** The Contractor Amount used as the basis for payment pursuant to the accounting under this Paragraph 15.1.5 shall be calculated as follows:

(a) take a portion of the Contract Price determined by multiplying (i) the Contract Price, by (ii) the County's Good Faith Determination of the percentage of the Work properly performed by Contractor and (A) in permanent place, (B) previously fabricated and delivered to the Site or (C) fabricated and en route for delivery to the Site and delivered to the Site within a reasonable time after Contractor's receipt of such written notice; and

(b) subtract therefrom all amounts previously paid by County to Contractor or to Subcontractors.

(5) **County Amount.** The County Amount used as the basis for payment pursuant to the accounting under this Paragraph 15.1.5 shall be calculated based on the sum of all past, present and future Losses to County resulting or reasonably certain to result, directly or indirectly, from any or all of the following: (a) any negligence, willful misconduct, or Defective Work on the part of Contractor or any Subcontractor; (b) any Event of Contractor Default, whether or not constituting the basis of the County's termination or discontinuance; (c) the County's exercise of its rights and remedies under and in accordance with the Contract Documents or Applicable Laws following the occurrence of an Event of Contractor Default; and (d) the payment by County of amounts to Contractor or any Subcontractor that were not owing to Contractor or that were in excess of the amount to which Contractor was entitled under the Contract Documents.

.2 **Partial Termination or Discontinuance.** In the event an exercise by County of its remedies for an Event of Contractor Default results in a discontinuance or termination of only a portion of the Work, then the Contract Price and Contract Time shall be adjusted under the provisions of Article 7 and Article 8, above, applicable to Deleted Work. Contractor shall thereafter continue to be paid for its performance of the other portions of the Work in accordance with the terms of the Contract Documents, less any amounts that County is entitled to withhold under the terms of the Contract Documents.

.3 **Exclusive Compensation.** Contractor agrees to accept such amounts, if any, as allowed under this Paragraph 15.1.5 as its sole and exclusive compensation in the event of an exercise by County of its remedies permitted by the Contract Documents or Applicable Laws following an Event of Contractor Default.

15.1.6 **Surety.** Without limitation to any of the County's other rights or remedies under a Performance Bond furnished by Contractor, Contract Documents or Applicable Laws, the County has the right to suspend, take over or terminate the performance of the Work by Surety in the event of any of the following: (1) failure of Surety or its contractors to begin the Work within a reasonable time in such manner as to ensure full compliance with the Contract Documents within the Contract Time; (2) abandonment of the Work by Surety or its contractors; (3) if at any time the County makes a Good Faith Determination that the Work is unnecessarily or unreasonably delayed by Surety or its contractors; (4) violation by Surety or its contractors of any terms of the Contract Documents, Performance Bond or Applicable Laws; or (5) failure by Surety or its contractors to follow instructions of the County for performance of the Work or for performance of the Work within the Contract Time. By executing its Performance Bond incorporating the terms of the Construction Contract, Surety shall be deemed to have agreed, without limitation, to the provisions of this

Paragraph 15.1.6 as constituting a binding obligation of Surety under its Performance Bond that shall control over any conflicting provisions set forth in the Performance Bond.

**15.1.7 Conversion.** In the event a termination for cause by the County is adjudged by a court or by binding arbitration conducted in accordance with the Contract Documents to have been wrongful, such termination shall be deemed converted to a termination for convenience pursuant to Section 15.3, below, in which case Contractor agrees to accept such amount, if any, as permitted by Paragraph 15.3.3, below, as its sole and exclusive compensation and agrees to waive any right to recovery of any other compensation or Loss, including, but not limited to, loss of anticipated profits, loss of revenue, lost opportunity or other consequential, direct, indirect or incidental damages, of any kind.

**15.1.8 Substantial Performance Waived.** The legal doctrine that a contractor may recover for substantial performance of a building contract is to have no application to the Construction Contract. Any Event of Contractor Default, whether occurring before or after the Work is Substantially Completed, shall be deemed material and shall give rise to the right of County to exercise its remedies permitted under the Contract Documents or Applicable Laws.

**15.1.9 Cross Default.** Contractor agrees that a breach of any other agreement between Contractor and County, whether related or unrelated to the Project, that is not cured in accordance with the terms of such other agreement constitutes an Event of Contractor Default under the Construction Contract, thereby entitling County to assert all its rights and remedies hereunder including, but not limited to, a specific right of off set by County against any amounts otherwise payable to Contractor under the Construction Contract or any other agreement between Contractor and County.

**15.1.10 Rights Cumulative.** All of County's rights and remedies under the Contract Documents are cumulative, and shall be in addition to and not a limitation upon those rights and remedies available under Applicable Laws.

**15.1.11 Materiality.** Designation in the Contract Documents of certain defaults as "material" shall not be construed as implying that other defaults not so designated are not material nor as limiting County's right to terminate or exercise its other rights or remedies for default to only material defaults.

**15.1.12 County Action.** No termination or action taken by County after termination shall prejudice any rights or remedies of County provided by Applicable Laws or by the Contract Documents, including, without limitation, the right of County to proceed against Contractor to recover all Losses suffered by reason of Contractor's default.

## **15.2 SUSPENSION BY COUNTY FOR CONVENIENCE**

**15.2.1 Suspension Order.** Without limitation to the County's rights under Section 15.1, above, County may, at any time, for its convenience and without the occurrence of any Event of Contractor Default, order Contractor, in writing, to suspend, delay or interrupt performance of the Work, in whole or in part. Upon receipt of such an order, Contractor shall comply with its terms and take all reasonable steps to minimize additional costs that are incurred applicable to the portion of the Work suspended, delayed or interrupted by County.

**15.2.2 Resumption.** If an order issued by the County pursuant to this Section 15.2 is canceled or expires, Contractor shall resume and continue with the previously affected portion of the Work. In such event, Contractor shall be entitled to a Contract Adjustment for additional Allowable Costs necessarily caused by such order and compensation allowed under Section 3.3 of the Construction Contract for Compensable Delay; provided, however, that no such Contract Adjustment shall be made: (1) to the extent that performance either is, was or would have been so suspended, delayed or interrupted by another cause for which Contractor or any of the Subcontractors is responsible or for which Contractor would not be entitled to a Contract Adjustment; (2) to the extent that a Contract Adjustment on account thereof is made or denied under another provision of the Contract Documents; or (3) for any general or specific escalation in prices of the Work.

**15.2.3 Limitation.** The provisions of this Section 15.2 shall not apply unless a written order is issued by County pursuant to this Section 15.2.

### 15.3 TERMINATION BY COUNTY FOR CONVENIENCE

**15.3.1 Right to Terminate for Convenience.** Without limitation upon any of County's other rights or remedies under the Contract Documents or Applicable Laws, County shall have the option, at its sole discretion and without the occurrence of any Event of Contractor Default or any other cause, to terminate the Construction Contract or Work, in whole or in part, for its convenience by giving five (5) Days written notice to Contractor.

**15.3.2 Contractor Obligations.** Upon receipt of notice of termination for convenience pursuant to this Section 15.3, Contractor shall, unless such notice directs otherwise, comply with all of the provisions of Paragraph 15.1.4, above.

**15.3.3 Contractor Compensation.** Following a termination for convenience pursuant to this Section 15.3 and within sixty (60) Days after receipt of a complete and timely Application for Payment from Contractor, an accounting shall be conducted in accordance with the process set forth in Paragraph 15.1.5, above. In such event, the amount due to Contractor shall be the Contractor Amount as calculated in the same manner provided for in Paragraph 15.1.5, above, except that there shall be added to the calculation of the Contractor Amount an amount for: (1) the reasonable, actual and direct Allowable Costs incurred and paid by Contractor (and not by Subcontractors) for (a) demobilizing Contractor's facilities from the Site, and (b) Contractor's administering the close out of its participation in the Project for a period of no longer than fifteen (15) Days; plus (2) a markup to Contractor on the Contractor's Allowable Costs incurred under Clause (1) of this Paragraph 15.3.4 that is based on the percentage for Allowable Markup that Contractor is permitted to charge pursuant to Article 7, above, for Compensable Changes involving Extra Work that is Self-Performed Work.

**15.3.4 Exclusive Compensation.** Contractor agrees to accept the compensation allowed under Paragraph 15.3.3, above, as its sole and exclusive compensation in the event of a termination by County for convenience and waives any claim for Loss related to County's termination for convenience, including, but not limited to, loss of anticipated profits, loss of revenue, lost opportunity, or other consequential, direct, indirect, or incidental damages, of any kind.

**15.3.5 Subcontractors.** Contractor shall include provisions in all of its subcontracts, purchase orders and other contracts with the Subcontractors permitting termination for convenience by Contractor on terms that are consistent with, and that afford no greater rights of recovery against Contractor for termination than are afforded to Contractor under, this Section 15.3.

### 15.4 TERMINATION BY CONTRACTOR

**15.4.1 Contractor's Remedies.** Subject to the provisions of Paragraph 15.4.2, below and Paragraph 15.4.3, below, Contractor's sole right to terminate the Construction Contract shall be its right to terminate, for cause only, upon the occurrence of either of the following:

.1 the entire Work is stopped for one hundred sixty (160) consecutive Days, through no act or fault of Contractor or any of the Subcontractors, of any Tier, or any employee or agent of any of them, due to issuance of an order of a court or other Governmental Authority or due to a declaration of a national emergency making material unavailable; or

.2 the entire Work is suspended by Contractor, in accordance with a proper exercise by Contractor of its rights under Section 9.8, above, for a continuous period of thirty (30) Days.

**15.4.2 Notice of Intention to Terminate.** If one of the reasons to terminate as described in Paragraph 15.4.1, above, exists, Contractor may, upon thirty (30) Days written notice to County, terminate the Construction Contract and recover from County as its sole and exclusive compensation such sums as are permitted under Paragraph 15.3.3, above.

**15.4.3 Continuous Performance.** Provided that Contractor is paid undisputed sums due in accordance with the requirements of the Construction Contract, Contractor shall not stop, delay or interrupt continuous performance of the Work by reason of any dispute or disagreement with County, including, without limitation, any disputes or disagreements over payments of money claimed due under the Contract Documents.

## 15.5 WARRANTIES

All obligations of Contractor and the Subcontractors under the Contract Documents with respect to warranties and guarantees of the Work will continue in force and shall apply, notwithstanding a termination or other discontinuance of the Work by County or Contractor pursuant to an exercise of rights by either under this Article 15, to any portion of the Work that at the time of such termination or discontinuance has been completed or partially completed by Contractor to the point that it is substantially ready (exclusive of any incidental work that may be needed to connect such portion to other Work to other Work or Existing Improvements or to energize such portion of the Work for operation) for use or occupancy by County.

## ARTICLE 16 NON-DISCRIMINATION

### 16.1 NON-DISCRIMINATION IN SERVICES

**16.1.1** Contractor must, in accordance with Applicable Laws, not discriminate in the provision of services hereunder because of race, color, religion, national origin, ancestry, sex, age, sexual orientation, marital status, AIDS or disability. For the purpose of this Section 16.1, discrimination in the provision of services may include, but is not limited to the following:

- .1 denying any person any service or benefit or the availability of a facility;
- .2 providing any service or benefit to any person which is not equivalent to, or is in a non-equivalent manner or at a non-equivalent time from, that provided to others;
- .3 subjecting any person to segregation or separate treatment in any manner related to the receipt of any service;
- .4 restricting any person in any way in the enjoyment of any advantage or privilege enjoyed by others receiving any service or benefit; or
- .5 treating any person differently from others in determining admission, enrollment, eligibility, membership, or any other requirement or condition which persons must meet in order to be provided any service or benefit.

**16.1.2** Contractor shall ensure that services are provided without regard to race, color, religion, national origin, ancestry, sex, age, sexual orientation, marital status, AIDS or disability.

**16.1.3** Contractor shall establish and maintain written procedures under which any person applying for, performing or receiving services hereunder, may seek resolution from Contractor of a complaint with respect to any alleged discrimination. Such persons shall be advised by Contractor of these procedures. A copy of such procedures shall be posted by Contractor in a conspicuous place, available and open to the public, in each of Contractor's facilities where services are provided hereunder.

### 16.2 NON-DISCRIMINATION IN EMPLOYMENT

Contractor must, in accordance with Applicable Laws, not discriminate against any employee or applicant for employment because of race, color, religion, national origin, ancestry, sex, age, sexual orientation, marital status, AIDS or disability. Without limitation to any other provisions of this Section 16.2, in the performance of the obligations under the Contract Documents, Contractor and the Subcontractors shall comply with all applicable provisions of the California Fair Employment Practices Act (California Government Code §§12940-48) and the applicable equal employment provisions of the Civil Rights Act of 1964 (42 U.S.C. §§200e - 217), whichever is more restrictive. Contractor and the Subcontractors shall ensure that qualified applicants are employed and that employees are treated during employment without regard to race, color, religion, national origin, ancestry, sex, age, sexual orientation, marital status, AIDS or disability, in accordance with requirements of Applicable Laws. Such shall include, but not be limited to, the following:

.1 employment, promotion, demotion, transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation; or

.2 selection for training, including apprenticeship.

**16.2.1** Contractor agrees to post in conspicuous places in each of Contractor's facilities providing services hereunder, available and open to employees and applicants for employment, notices setting forth the provisions of this Section 16.2.

**16.2.2** Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, national origin, ancestry, sex, age, sexual orientation, marital status, AIDS or disability, in accordance with requirements of Applicable Laws.

**16.2.3** Contractor shall send to each labor union, or workers' representative with which it has a collective bargaining agreement or other contract or understanding, a notice advising the labor union or the workers' representative of Contractor's commitments under this Section 16.2.

**16.2.4** Contractor certifies and agrees that it will deal with the Subcontractors, bidders and vendors without regard to race, color, religion, national origin, ancestry, sex, age, sexual orientation, marital status, AIDS or disability, in accordance with the requirements of Applicable Laws.

**16.2.5** In accordance with Applicable Laws, Contractor shall allow duly authorized representatives of the County, State, and Federal government access to its employment records during regular business hours in order to verify compliance with the provisions of this Section 16.2. Contractor shall provide such other information and records as such representatives may require in order to verify compliance with the provisions of this Section 16.2.

**16.2.6** If County finds that any of the provisions of this Section 16.2 have been violated by Contractor or any of the Subcontractors, such violation shall constitute a material breach of the Construction Contract for which County may cancel, terminate or suspend the Construction Contract. While County reserves the right to determine independently that the anti-discrimination provisions of the Construction Contract have been violated, a determination by the California Fair Employment and Housing Commission or the Federal Equal Employment Opportunity Commission that Contractor or the Subcontractor has violated State or Federal anti-discrimination laws shall constitute a finding by County that Contractor or the Subcontractor has violated the provisions of this Section 16.2.

**16.2.7** Contractor hereby agrees that it will comply with §504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794) and similar Applicable Laws relating to employment of or access to persons with disabilities, all requirements imposed by applicable Federal Regulations, and all guidelines and interpretations issued pursuant thereto, to the end that no qualified disabled person shall, on the basis of disability, be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination under any program or activity of Contractor receiving Federal Financial Assistance.

**END OF GENERAL CONDITIONS**



DATE: March 2018  
SPECIFICATIONS

JOB: 338-30-17

**RIVERSIDE COUNTY  
FIRE DEPARTMENT STATION #77  
LAKE RIVERSIDE EXPANSION PROJECT  
49937 COMANCHE CT  
AGUANGA, CA 92536**



STK ARCHITECTURE, INC.  
ARCHITECTURE/PLANNING  
42095 ZEVO DRIVE, STE A-15  
TEMECULA, CA 92590  
951.296.9110

CIVIL ENGINEER  
Cozad and Fox, Inc.  
151 S. Girard St.  
Hemet, CA 92544  
951.652.4454

MECH/PLUMBING/ELEC ENGINEER  
T-Squared Professional Engineers  
1340 Specialty Drive, Suite E  
Vista, CA 92081  
760.560.0100

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DATED: 4/4/18



DATE: March 2018  
SPECIFICATIONS

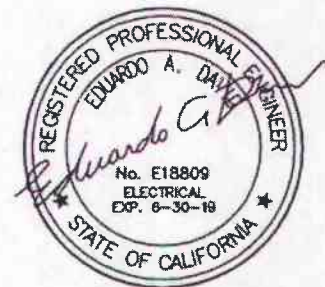
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DIVISION	SECTION	TITLE
00		PROCUREMENT and CONTRACTING REQUIREMENTS
	00 3100	Available Project Information
01		GENERAL REQUIREMENTS
	01 2000	Contract Considerations
	01 3000	Submittals
	01 3100	Coordination
	01 4200	Reference Standards and Definitions
	01 4500	Quality Control
	01 5000	Temporary Facilities and Controls
	01 5100	Temporary Utilities
	01 5713	Temporary Erosion Control
	01 6000	Product Requirements
	01 7000	Execution Requirements
	01 7419	Construction Waste Management
	01 7700	Closeout Procedures
03		CONCRETE
	03 3000	Cast-in-Place Concrete
05		METALS
	05 4000	Cold Formed Metal Framing
	05 5000	Metal Fabrications
07		THERMAL AND MOISTURE PROTECTION
	07 2100	Thermal Insulation
	07 6200	Sheet Metal Flashing and Trim
	07 9005	Joint Sealers
08		OPENINGS
	08 1113	Hollow Metal Doors and Frames
	08 3323	Overhead Coiling Doors
	08 7100	Door Hardware
09		FINISHES
	09 2116	Gypsum Board Assemblies
	09 7730	Sanitary Wall Panels
	09 9000	Painting and Coating

<u>DIVISION</u>	<u>SECTION</u>	<u>TITLE</u>
10		SPECIALTIES
	10 0000	Miscellaneous Specialties
	10 4416	Fire Extinguishers
13		SPECIAL CONSTRUCTION
	13 3419	Metal Building Systems
22		PLUMBING
	22 0517	Sleeves and Sleeve Seals for Plumbing Piping
	22 0518	Escutcheons for Plumbing Piping
	22 0523	General-Duty Valves for Plumbing Piping
	22 0553	Identification for Plumbing Piping and Equipment
	22 0719	Plumbing Piping Insulation
	22 1116	Domestic Water Piping
	22 1119	Domestic Water Piping Specialties
	22 1316	Sanitary Waste and Vent Piping
	22 1319	Sanitary Waste Piping Specialties
	22 1513	General Service Compressed Air Piping
	22 1519	General Service Packaged Air Compressors and Receivers
	22 3400	Fuel-Fired Domestic-Water Heaters
	22 4216.16	Commercial Sink
23		MECHANICAL
	23 0000	General Mechanical Requirements
	23 0500	Basic Mechanical Materials and Methods
	23 0529	Hangers and Support for HVAC Piping and Equipment
	23 0548	Vibration and Seismic Controls for HVAC Piping and Equipment
	23 0553	Identification for Piping and Equipment
	23 0593	Testing, Adjusting, and Balancing
	23 1123	Facility Natural Gas Piping
	23 3113	Ducts
	23 3300	Air Duct Accessories
	23 3423	HVAC Power Ventilators
	23 3713	Diffusers, Registers, and Grilles
	23 5533	Fuel Fired Unit Heaters
26		ELECTRICAL
	26 0126	Electrical Acceptance and Start-Up Tests
	26 0510	General Electrical Requirements
	26 0519	Building Wires and Cable

<u>DIVISION</u>	<u>SECTION</u>	<u>TITLE</u>
	26 0526	Grounding and Bonding for Electrical Systems
	26 0529	Hangers and Supports for Electrical Systems
	26 0533	Raceways and Boxes for Electrical Systems
	26 0534	Outlet, Pull and Junction Boxes
	26 0543	Underground Ducts and Raceways
	26 0553	Identification for Electrical Systems
	26 0573	Overcurrent Protective Devices
	26 0923	Lighting Control Devices
	26 2413	Switchboards
	26 2416	Panelboards
	26 2701	Electrical Utility Services
	26 2726	Wiring Devices
	26 2813	Fuses
	26 2816	Enclosed Switches and Circuit Breakers
	26 5600	Exterior Luminaires
31		EARTHWORK
	31 1000	Site Clearing
	31 2200	Grading
	31 2316	Excavation
	31 2323	Fill and Backfill
32		EXTERIOR IMPROVEMENTS
	32 1313	Concrete Paving
	32 1713	Wheel Stops
	32 1726	Tactile Detectable Warning Tile
33		UTILITIES
	33 3413	Septic Tanks

**SECTION 00 3100**  
**AVAILABLE PROJECT INFORMATION**

**PART 1 GENERAL**

**1.01 EXISTING CONDITIONS**

- A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders as follows:
- B. Geotechnical Report: Entitled Preliminary Geotechnical Report, New Apparatus Bay, Fire Station 77, dated March 29, 2017. Prepared by Inland Foundation Engineering, Inc.
  - 1. Original copy is available for inspection at Owner's offices during normal business hours.
  - 2. This report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of Architect.
  - 3. The recommendations described shall not be construed as a requirement of this Contract, unless specifically referenced in the Contract Documents.
  - 4. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Price accruing to Owner.
- C. Percolation Investigation: Entitled Proposed Apparatus Bay, Fire Station 77, APN 580-240-022. Dated May 8, 2017. Prepared by Inland Foundation Engineering, Inc.
  - 1. Original copy is available for inspection at Owner's offices during normal business hours.
- D. Infiltration Testing: Entitled Proposed Infiltration Basins, CAL Fire Station 77 Dated March 23, 2018. Prepared by Inland Foundation Engineering, Inc.
  - 1. Original copy is available for inspection at Owner's offices during normal business hours.

**SECTION 01 2000  
CONTRACT CONSIDERATIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Schedule of Values.
- B. Application for Payment.
- C. Defect Assessment.
- D. Non-payment for Rejected Work.
- E. Change Procedures.

**1.02 SCHEDULE OF VALUES**

- A. Submit Schedule of Values for approval at Pre-Construction Meeting.
- B. Format: Submit typed schedule based upon the Schedule of Values Format shown in Paragraph 3.01 (hereinafter).
- C. Include in each line item, the amount of Allowances specified in this section.
- D. Include within each line item, a directly proportional amount of Contractor's Overhead and Profit.
- E. Revise Schedule to list approved Change Orders, on continuation sheet, with each Application for Payment.

**1.03 APPLICATION FOR PAYMENT**

- A. Submit two (2) copies of each Application on AIA Form G702 - "Application and Certificate for Payment".
- B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

**1.04 DEFECT ASSESSMENT**

- A. Replace the work, or portions of the work, not conforming to specified requirements.
- B. If in the opinion of the Architect, it is not practical to remove and replace the work, the Architect will direct one of the following remedies:
  - 1. The defective work may remain, but the listed schedule of value will be adjusted to a new value at the discretion of the Architect.
  - 2. The defective work will be partially repaired to the instructions and satisfaction of the Architect and the listed schedule of value will be adjusted to reflect a new value at the discretion of the Architect.

**1.05 NON-PAYMENT FOR REJECTED WORK**

- A. Payment will not be made for any of the following:
  - 1. Products wasted or disposed of in a manner that is not acceptable.
  - 2. Products determined to be unacceptable before or after placement.
  - 3. Products not completely unloaded from the transporting vehicle.
  - 4. Products placed beyond the lines and levels of the required work.
  - 5. Products remaining on hand after completion of the work.
  - 6. Loading, hauling and disposing of rejected products.

**1.06 CHANGE PROCEDURES**

- A. Per Article 7 of the General Conditions: Changes in the Work.

**PART 2 PRODUCTS**

-- NOT APPLICABLE --

**PART 3 EXECUTION**

-- NOT APPLICABLE--

**END OF SECTION**



**SECTION 00 3100  
AVAILABLE PROJECT INFORMATION**

**PART 1 GENERAL**

**1.01 EXISTING CONDITIONS**

- A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders as follows:
- B. Geotechnical Report: Entitled Preliminary Geotechnical Report, New Apparatus Bay, Fire Station 77, dated March 29, 2017. Prepared by Inland Foundation Engineering, Inc.
  - 1. Original copy is available for inspection at Owner's offices during normal business hours.
  - 2. This report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of Architect.
  - 3. The recommendations described shall not be construed as a requirement of this Contract, unless specifically referenced in the Contract Documents.
  - 4. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Price accruing to Owner.
- C. Percolation Investigation: Entitled Proposed Apparatus Bay, Fire Station 77, APN 580-240-022. Dated May 8, 2017. Prepared by Inland Foundation Engineering, Inc.
  - 1. Original copy is available for inspection at Owner's offices during normal business hours.
- D. Infiltration Testing: Proposed Infiltration Basins dated March 23, 2018. Prepared by Inland Foundation Engineering, Inc.
  - 1. Original copy is available for inspection at Owner's offices during normal business hours.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION (NOT USED)**

**END OF SECTION**

**SECTION 01 3000**  
**SUBMITTALS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including the following:
  - 1. Contractor's Construction Schedule.
  - 2. Shop Drawings.
  - 3. Product Data.
  - 4. Samples.
  - 5. Daily Construction Reports.
- B. Administrative Submittals: Refer to other Division 1 Sections and other Contract Documents for requirements for Administrative Submittals. Such submittals include, but are not limited to, the following:
  - 1. Permits.
  - 2. Applications for Payment.
  - 3. Performance and Payment Bonds.
  - 4. Insurance Certificates.
  - 5. List of Subcontractors.
- C. Related Sections: The following sections contain requirements that relate to this section:
  - 1. Section 01 3100 - "Coordination" specifies requirements governing preparation and submittal of required coordination drawings.
  - 2. Section 01 4500 - "Quality Control" specifies requirements for submittal of inspection and test reports.

**1.02 DEFINITIONS**

- A. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.
  - 1. Preparation of coordination drawings is specified in Section 01 31 00 - "Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
- B. Field Samples are full-size physical examples erected on-site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the work will be judged.
- C. Mockups are full-size assemblies for review of construction, coordination, testing or operation; they are not Samples.

**1.03 SUBMITTAL PROCEDURES**

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
  - 1. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
    - a. Allow two (2) weeks for initial review. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals.
    - b. If an intermediate submittal is necessary, process the same as the initial submittal.
    - c. Allow two (2) weeks for reprocessing each submittal.
    - d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the work to permit processing.
- B. Submittal Transmittal: Package each submittal appropriately for handling. Transmit each submittal from the Contractor to the Architect using a transmittal form, including Job Name, Specification Section Number and Required Lead-Time. The Architect will not accept submittals received from sources other than the Contractor.

1. Submit samples for review of size, kind, finish, color, pattern and texture. Submit samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
  - a. Where variation in color, pattern, texture or other characteristic is inherent in the material or product represented, submit at least three (3) multiple units that show approximate limits of the variations.
2. Maintain sets of Samples, as returned, at the project site, for quality comparisons throughout the course of construction.

#### **1.10 ARCHITECT'S ACTION**

- A. Except for submittals for the record or information, where action and return is required, the Architect will review each submittal, mark to indicate action taken, and return.
  1. Compliance with specified characteristics is the Contractor's responsibility.
- B. Action Stamp: The Architect will stamp each submittal with a uniform, action stamp. The Architect will review each submittal, mark to indicate action taken, and return.
  1. Final Unrestricted Release: When the Architect marks a submittal "No Exception Taken", the work covered by the submittal may proceed provided it complies with requirements of the Contract Documents.
  2. Final-but-Restricted Release: When the Architect marks a submittal "Make Corrections Noted", the work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents.
  3. Returned for Resubmittal: When the Architect marks a submittal "Rejected", "Revise and Resubmit" do not proceed with work covered by the submittal, including purchasing, fabrication, delivery or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
    - a. Do not use, or allow others to use, submittals marked "Rejected", "Revise and Resubmit" at the project site or elsewhere where work is in progress.
- C. Unsolicited Submittals: The Architect will return unsolicited submittals to the sender without action.

#### **1.11 DAILY CONSTRUCTION REPORTS**

- A. Prepare a Daily Construction Report recording the following information concerning events at the site, and submit duplicate copies to the Owner and Architect at two-week intervals.
  1. List of Subcontractors at the site.
  2. Approximate count of personnel at the site.
  3. High and low temperatures, general weather conditions.
  4. Accidents and unusual events.
  5. Meetings and significant decisions.
  6. Stoppages, delays, shortages and losses.
  7. Emergency procedures.
  8. Orders and requests of governing authorities.
  9. Services connected, disconnected.
  10. Equipment or system tests and startups.

#### **PART 2 PRODUCTS**

-- NOT APPLICABLE --

#### **PART 3 EXECUTION**

-- NOT APPLICABLE --

**END OF SECTION**

**SECTION 01 3100  
COORDINATION**

**PART 1 GENERAL****1.01 GENERAL COORDINATION PROVISIONS**

- A. Carefully study and compare Contract Documents before proceeding with fabrication and installation of work. Promptly advise Architect of any error, inconsistency, omission or apparent discrepancy discovered.
- B. Allot time in construction scheduling for liaison with Architect; establish procedures for handling queries and clarifications. Use "Request for Information " (RFI) form for requesting information.
- C. If Architect is able to respond to a Request for Information (RFI), by making specific reference to Drawing sheet of Specification section, Contractor shall reimburse Owner for charges of Architect and Architect's Consultants for performing review services for the Contractor.
- D. Coordinate work of various specification sections having interdependent responsibilities for installation, connection and operation.

**1.02 SUMMARY**

- A. This section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:
  - 1. General project coordination procedures.
  - 2. Administrative and supervisory personnel
  - 3. Cleaning and protection.
- B. Related Sections: The following sections contain requirements that relate to this section:
  - 1. Section 01 7700 - "Closeout Procedures" for coordinating contract closeout.

**1.03 COORDINATION DRAWINGS AND LAYOUTS**

- A. General:
  - 1. Coordination Drawings are not Shop Drawings and are not to be submitted to Architect for approval.
  - 2. Coordination drawings show relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in space provided or to function as intended.
- B. Coordinate in field with affected trades for proper relationship to work based on project conditions.
- C. Notify Architect of conflicts and other coordination issues requiring resolution prior to commencing construction in each affected area.
- D. Make coordination documents available in field office for review by Architect and Owner during entire period of construction.

**1.04 COORDINATION**

- A. Coordinate construction operations included in various sections of these specifications to assure efficient and orderly installation of each part of the work.
  - 1. Schedule construction operations in the 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 to assure maximum accessibility for required maintenance, service and repair.
  - 3. Make provisions to accommodate items scheduled for later installation.
- B. The Contractor shall review the entire construction document set for dimensional coordination. Special attention should be placed on architectural/structural dimension coordination.
  - 1. If discrepancies occur, the Contractor is directed to place a written request to the Project Architect for clarification. This request must occur prior to any work occurring.

2. Proceeding into an area of work without checking the documents for dimensional coordination and resolving the condition in a timely manner will in no way release the Contractor from correction procedures.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the work. Such administrative activities include, but are not limited to, the following:
  1. Preparation of schedules.
  2. Installation and removal of temporary facilities.
  3. Delivery and processing of submittals.
  4. Progress meetings.
  5. Project closeout activities.

## **PART 2 PRODUCTS**

**-- NOT APPLICABLE --**

## **PART 3 EXECUTION**

### **3.01 GENERAL COORDINATION PROVISIONS**

- A. Inspection of Conditions: Require the installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

### **3.02 CLEANING AND PROTECTION**

- A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.
- B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.
- C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
  1. Excessively high or low temperatures.
  2. Excessively high or low humidity.
  3. Air contamination or pollution.
  4. Water or ice.
  5. Solvents.
  6. Chemicals.
  7. Light.
  8. Radiation.
  9. Puncture.
  10. Heavy traffic.
  11. Soiling, staining and corrosion.
  12. Combustion.
  13. Electrical current.
  14. Improper lubrication.
  15. Unusual wear or other misuse.
  16. Contact between incompatible materials.
  17. Misalignment.
  18. Excessive weathering.

19. Unprotected storage.
20. Improper shipping or handling.
21. Theft.
22. Vandalism.

**END OF SECTION**

**SECTION 01 4200**  
**REFERENCE STANDARDS AND DEFINITIONS**

**PART 1 GENERAL****1.01 REFERENCES**

- A. The Contract Documents contain references to various standard specifications, codes, practices and requirements for materials, work quality, installation, inspections and tests, which references are published and issued by the organizations listed hereinafter by abbreviation and name. Such references are hereby made a part of these Contract Documents to the extent indicated or required.

**1.02 DEFINITIONS**

- A. General: Basic contract definitions are included in the General and Special Conditions of the Contract.
- B. "Indicated": The term "indicated" refers to graphic representations, notes or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown", "noted", "scheduled" and "specified" are used to help the user locate the reference. Location is not limited.
- C. "Directed": Terms such as "directed", "requested", "authorized", "selected", "approved", "required" and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases.
- D. "Approved": The term "approved", when used in conjunction with the Architect's action on the Contractor's submittals, applications and requests, is limited to the Architect's duties and responsibilities as stated in the General and Special Conditions of the Contract.
- E. "Regulations": The term "regulations" includes laws, ordinances, statutes and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": The term "furnish" means to supply and deliver to the project site, ready for unloading, unpacking, assembly, installation and similar operations.
- G. "Install": The term "install" describes operations at the project site including the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations.
- H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor or contractor of lower tier, who performs a particular construction activity including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
1. The term "experienced", when used with the term "installer", means having successfully completed previous projects similar in size and scope to this project, being familiar with the specified requirements indicated; and having complied with requirements of authorities having jurisdiction.
  2. Trades: Using terms 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.
  3. Assigning Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.

- a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.
- J. "Project Site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing work as part of the Project. The extent of the project site is shown on the drawings and may or may not be identical with the description of the land on which the Project is to be built.
- K. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

### 1.03 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 2004 "Masterformat" numbering system.
- B. Specification Content: These 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 Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate words implied, but not stated, shall be interpolated as the sense requires. Singular words shall be interpreted as plural and plural words 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 the Contractor. At certain locations in the text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the 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.

### 1.04 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. When the effective date of a Reference Standard is not given, it shall be understood that the current edition or latest revision thereof and any amendments or supplements thereto in effect on the date of issue of these Contract Documents, as indicated by the date on the cover sheet or in the Invitation to Bid, shall govern the work.
- C. Conflicting Requirements: Where compliance with 2 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 Architect 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 the requirements. Refer uncertainties to the Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on the 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, the Contractor shall obtain copies directly from the publication source and make them available on request.
- E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. The following list of general reference standards is common to the construction industry. This list is not all-inclusive nor does the presence of a reference standard imply necessarily that it is referenced in the Specifications or other Contract Documents.

AAAluminum Association  
 AABCAssociated Air Balance Council  
 AAMA American Architectural Manufacturers Association  
 AASHTO American Association of State Highway and Transportation Officials  
 ACIAmerican Concrete Institute International  
 ADCAmerican Diffusion Council  
 AGAAmerican Gas Association  
 AIAAmerican Institute of Architects  
 AISCAmerican Institute of Steel Construction  
 AISIAmerican Iron and Steel Institute  
 ALSCAmerican Lumber Standards Committee  
 AMCAAir Movement and Control Association International  
 ANSIAmerican National Standards Institute  
 APAEngineered Wood Association (Formerly American Plywood Ass'n)  
 ARIAir Conditioning and Refrigeration Institute  
 ASCEAmerican Society of Civil Engineers  
 ASHRAEAmerican Society of Heating, Refrigerating and Air Conditioning Engrs  
 ASMEThe American Society of Mechanical Engineers  
 ASPEAmerican Society of Plumbing Engineers  
 ASSEThe American Society of Sanitary Engineers  
 ASTM American Society for Testing and Materials  
 AWIArchitectural Woodwork Institute  
 AWSAmerican Welding Society  
 BHMABuilders Hardware Manufacturers Association  
 BIABrick Industry Association  
 CISCACeilings & Interior Systems Construction Association  
 CISPICast Iron Soil Pipe Institute  
 CLFMChain Link Fence Manufacturers Institute  
 CRSConcrete Reinforcing Steel Institute  
 DHIDoor and Hardware Institute (Formerly Ntl. Builders Hardware Assoc)  
 EIMAEIFS Industry Manufacturers Association  
 FGMAFlat Glass Marketing Association  
 FMFactory Mutual Research Corporation  
 GAGypsum Association  
 GANAGlass Association of North America

IAPMO International Association of Plumbing and Mechanical Officials  
 ICBO International Conference of Building Officials  
 ICC International Code Council  
 IEEE Institute of Electrical and Electronics Engineers  
 IESNA Illuminating Engineering Society of North America  
 IGCC Insulating Glass Certification Council  
 MBMA Metal Building Manufacturers Association  
 NAAMM The National Association of Architectural Metal Manufacturers  
 NCMANational Concrete Masonry Association  
 NEBB National Environmental Balancing Bureau  
 NECA National Electrical Contractors Association  
 NEMANational Electrical Manufacturers Association  
 NETANational Electrical Contractors Association  
 NFPA National Fire Protection Association  
 NRCANational Roofing Contractors Association  
 NSFNSF International (National Sanitation Foundation)  
 PCA Portland Cement Association  
 PDIPlumbing and Drainage Institute  
 SDI Steel Door Institute  
 SGCC Safety Glazing Certification Council  
 SJI Steel Joist Institute  
 SMACNASheet Metal and Air Conditioning Contractors' National Association  
 TCATile Council of America  
 UBC Uniform Building Code (International Conference of Building Officials)  
 UL Underwriters Laboratories, Inc.  
 WCLIB West Coast Lumber Inspection Bureau  
 WDMA Window and Door Manufacturers Association (Formerly NWWDA)  
 WI Woodwork Institute

- F. Federal Government Agencies and Acronyms: Names and titles of Federal Government standards - or specification-producing agencies are often abbreviated. The following abbreviations and acronyms which may be referenced in the Contract Documents indicate names of standards - or specification-producing agencies of the Federal Government. This list is not all-inclusive nor does presence on the list imply necessarily that the abbreviation is referenced in the Specifications or other Contract Documents.

ADA Americans with Disabilities Act  
 CFR Code of Federal Regulations  
 COE Corps of Engineers, U S Army  
 CPSC Consumer Product Safety Commission  
 DOC Department of Commerce  
 DOT Department of Transportation  
 EPA Environmental Protection Agency  
 FAA Federal Aviation Administration

FCCFederal Communications Commission  
FDAFood and Drug Administration  
FHAFederal Housing Administration  
FSFederal Specifications and Standards (General Services Admin)  
GSAGeneral Services Administration  
MILMilitary Specifications and Standards (U S Dept of Defense)  
NISTNational Institute of Standards and Technology  
OSHAOccupational Safety and Health Administration (U S Dept of Labor)  
PSPProduct Standards (U S Dept of Commerce)  
USDAUnited States Department of Agriculture  
USPSUnited States Postal Service

**PART 2 PRODUCTS**

-- NOT APPLICABLE --

**PART 3 EXECUTION**

-- NOT APPLICABLE --

**END OF SECTION**

**SECTION 01 4500**  
**QUALITY CONTROL**

**PART 1 GENERAL****1.01 SUMMARY**

- A. This section includes administrative and procedural requirements for quality-control services.
- B. Quality-Control services include inspections, tests and related actions, including reports performed and/or directed by the Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Architect.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated in the Construction Documents. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.

**1.02 RESPONSIBILITIES**

- A. Owner will employ and pay for services of an Independent Testing Laboratory to perform specified inspections and testing.
- B. Contractor Responsibilities:
  - 1. Deliver to laboratory at designated location, adequate samples of materials proposed to be used which require testing, along with proposed mix designs.
  - 2. Cooperate with laboratory personnel, and provide access to the work, and to manufacturer's facilities.
  - 3. Provide incidental labor and facilities to provide access to work to be tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, storage and curing of test samples.
  - 4. Notify Architect/Engineer and laboratory 24 hours prior to expected time for operations requiring inspection and testing services.
    - a. Unless otherwise indicated as the responsibility of another identified entity, Contractor shall provide inspections, tests and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction. Costs for these services are included in the Contract Sum.
      - 1) Where individual sections specifically indicate that certain inspections, tests, and other quality-control services are the Contractor's responsibility, the Contractor shall employ and pay a qualified independent testing agency to perform quality-control services. Costs for these services are included in the Contract Sum.
- C. Retesting: The Contractor is responsible for retesting where results of inspections, tests or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements.
  - 1. The cost of retesting construction, revised or replaced by the Contractor or Trade Subcontractor, is the Trade Subcontractor's responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements.
  - 2. Associated Services: Cooperate with agencies performing required inspections, tests and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:
    - a. Provide security and protection of samples and test equipment at the project site.
- D. Duties of the Testing Agency: The Independent Agency engaged to perform inspections, sampling and testing of materials and construction specified in individual sections shall cooperate with the Architect and the Contractor in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.
  - 1. The agency shall notify the Architect and the Contractor promptly of irregularities or deficiencies observed in the work during performance of its services.
  - 2. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents or approve or accept any portion of the work.

- E. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
  - 1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.
- F. Owner reserves the right to employ an Independent Testing agency at any time.

### 1.03 SUBMITTALS

- A. The Independent Testing Agency shall submit a certified written report, in duplicate, of each inspection, test or similar service to the Architect and Structural Engineer. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.
  - 1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
  - 2. Report Data: Written reports of each inspection, test or similar service include, but are not limited to, the following:
    - a. Date of issue.
    - b. Project title and number.
    - c. Name, address and telephone number of testing agency.
    - d. Dates and locations of samples and tests or inspections.
    - e. Names of individuals making the inspection or test.
    - f. Designation of the work and test method.
    - g. Identification of product and Specification Section.
    - h. Complete inspection or test data.
    - i. Test results and an interpretation of test results.
    - j. Ambient conditions at the time of sample taking and testing.
    - k. Comments or professional opinion on whether inspected or tested work complies with Contract Document requirements.
    - l. Name and signature of laboratory inspector.
    - m. Recommendations on retesting.

### 1.04 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as Reference Standards, comply with requirements of the Standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to Reference Standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of Standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties or responsibilities of the parties in contract nor those of Architect shall be altered from the Contract Documents by mention or inference in any reference document.

### 1.05 QUALITY ASSURANCE

- A. Qualifications of Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, that are prequalified as complying with the American Council of Independent Laboratories' "Recommended Requirements for Independent Laboratory Qualification" and that specialize in the types of inspections and tests to be performed.

1. Each Independent Inspection and Testing Agency engaged on the project shall be authorized by authorities having jurisdiction to operate in the state where the project is located.

**PART 2 PRODUCTS**

-- NOT APPLICABLE --

**PART 3 EXECUTION**

**3.01 REPAIR AND PROTECTION**

- A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Section 01 7000 - "Execution Requirements".
- B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.
- C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.
- D. Should manufacturer's instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- E. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes or specified requirements indicate higher standards or more precise workmanship.
- F. Have work performed by persons qualified to produce required and specified quality.
- G. Verify that field measurements are as indicated on Shop Drawings or and instructed by the manufacturer.
- H. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion and disfigurement.

**3.02 MANUFACTURER'S FIELD SERVICES**

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

**END OF SECTION**

**SECTION 01 5000**  
**TEMPORARY FACILITIES AND CONTROLS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Temporary sanitary facilities.
- B. Temporary Controls: Barriers and enclosures.
- C. Security requirements.
- D. Exterior Enclosures.
- E. Vehicular access and parking.
- F. Waste removal facilities and services.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 5100 - Temporary Utilities.

**1.03 TEMPORARY FACILITIES LOCATION**

- A. Designated locations of temporary facilities shall be determined at the preconstruction meeting.

**1.04 TEMPORARY SANITARY FACILITIES**

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Maintain daily in clean and sanitary condition.

**1.05 BARRIERS**

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

**1.06 EXTERIOR ENCLOSURES**

- A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

**1.07 SECURITY - SEE SECTION 01 3553**

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.

**1.08 VEHICULAR ACCESS AND PARKING - SEE SECTION 01 5500**

- A. Coordinate access and haul routes with governing authorities and Owner.
- B. Provide and maintain access to fire hydrants, free of obstructions.
- C. Provide means of removing mud from vehicle wheels before entering streets.
- D. Designated existing on-site roads may be used for construction traffic.
- E. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

**1.09 WASTE REMOVAL**

- A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

- B. Provide containers with lids. Remove trash from site periodically.
- C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

**1.10 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS**

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**



**SECTION 01 5100  
TEMPORARY UTILITIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary Utilities: Provision of Electricity, lighting, and water.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 5000 - Temporary Facilities and Controls:
  - 1. Temporary telecommunications services for administrative purposes.
  - 2. Temporary sanitary facilities required by law.

**1.03 TEMPORARY ELECTRICITY**

- A. Cost: By Contractor.
- B. Complement existing power service capacity and characteristics as required.
- C. Provide main service disconnect and over-current protection at convenient location and meter.
- D. Permanent convenience receptacles may be utilized during construction.
- E. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

**1.04 TEMPORARY WATER SERVICE**

- A. Cost of Water Used: By Contractor.
- B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.
- C. Connect to existing water source.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 5713**  
**TEMPORARY EROSION CONTROL**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Prevention of erosion due to construction activities.
- B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.
- C. Restoration of areas eroded due to insufficient preventive measures.
- D. Performance bond.
- E. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

**1.02 REFERENCE STANDARDS**

- A. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus; 2014.
- B. ASTM D4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 1999a (Reapproved 2014).
- C. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2011.
- D. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2015a.
- E. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile; 2012.
- F. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit; Current Edition.

**1.03 PERFORMANCE REQUIREMENTS**

- A. Coordinate work of this section with Owner-provided "Storm Water Pollution Prevention Plan (SWPPP) if required by local enforcement agency.
  - 1. Where requirements of both plans are in conflict, comply with the SWPPP.
  - 2. SWPPP Plan not required if disturbed area is less than 1 acre.
- B. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.
- C. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
- D. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.
- E. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
  - 1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
  - 2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.
- F. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
  - 1. Control movement of sediment and soil from temporary stockpiles of soil.
  - 2. Prevent development of ruts due to equipment and vehicular traffic.
  - 3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

- G. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
  - 1. Prevent windblown soil from leaving the project site.
  - 2. Prevent tracking of mud onto public roads outside site.
  - 3. Prevent mud and sediment from flowing onto sidewalks and pavements.
  - 4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- H. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
  - 1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
- I. Open Water: Prevent standing water that could become stagnant.
- J. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

#### 1.04 SUBMITTALS

- A. See Section 01 3000 - "Submittals", for submittal procedures.
- B. Erosion and Sedimentation Control Plan:
  - 1. Include:
    - a. Site plan identifying soils and vegetation, existing erosion problems, and areas vulnerable to erosion due to topography, soils, vegetation, or drainage.
    - b. Site plan showing grading; new improvements; temporary roads, traffic accesses, and other temporary construction; and proposed preventive measures.
    - c. Where extensive areas of soil will be disturbed, include storm water flow and volume calculations, soil loss predictions, and proposed preventive measures.
    - d. Schedule of temporary preventive measures, in relation to ground disturbing activities.
    - e. Other information required by law.
    - f. Format required by law is acceptable, provided any additional information specified is also included.
  - 2. Obtain the approval of the Plan by authorities having jurisdiction.
  - 3. Obtain the approval of the Plan by Owner.
- C. Certificate: Mill certificate for silt fence fabric attesting that fabric and factory seams comply with specified requirements, signed by legally authorized official of manufacturer; indicate actual minimum average roll values; identify fabric by roll identification numbers.
- D. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished.

### PART 2 PRODUCTS

#### 2.01 MATERIALS

- A. Mulch: Use one of the following:
  - 1. Straw or hay.
  - 2. Wood waste, chips, or bark.
  - 3. Erosion control matting or netting.
  - 4. Polyethylene film, where specifically indicated only.
- B. Grass Seed For Temporary Cover: Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons.
- C. Bales: Air dry, rectangular straw bales.
  - 1. Cross Section: 14 by 18 inches, minimum.
  - 2. Bindings: Wire or string, around long dimension.

- D. Bale Stakes: One of the following, minimum 3 feet long:
  - 1. Steel U- or T-section, with minimum mass of 1.33 lb per linear foot.
  - 2. Wood, 2 by 2 inches in cross section.
- E. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:
  - 1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D4751.
  - 2. Permittivity: 0.05 sec<sup>-1</sup>, minimum, when tested in accordance with ASTM D4491.
  - 3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355/D4355M after 500 hours exposure.
  - 4. Tensile Strength: 100 lb-f, minimum, in cross-machine direction; 124 lb-f, minimum, in machine direction; when tested in accordance with ASTM D4632/D4632M.
  - 5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632/D4632M.
  - 6. Tear Strength: 55 lb-f, minimum, when tested in accordance with ASTM D4533.
  - 7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

#### **3.02 PREPARATION**

- A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

#### **3.03 SCOPE OF PREVENTIVE MEASURES**

- A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.
- B. Storm Drain Curb Inlet Sediment Trap: Protect each curb inlet using one of the following measures:
  - 1. Filter fabric wrapped around hollow concrete blocks blocking entire inlet face area; use one piece of fabric wrapped at least 1-1/2 times around concrete blocks and secured to prevent dislodging; orient cores of blocks so runoff passes into inlet.
  - 2. Straw bale row blocking entire inlet face area; anchor into pavement.
- C. Storm Drain Drop Inlet Sediment Traps: As detailed on drawings.
- D. Temporary Splash Pads: Stone aggregate over filter fabric; size to suit application; provide at downspout outlets and storm water outlets.
- E. Soil Stockpiles: Protect using one of the following measures:
  - 1. Cover with polyethylene film, secured by placing soil on outer edges.
- F. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.
  - 1. Wood Waste: Use only on slopes 3:1 or flatter; no anchoring required.
- G. Temporary Seeding: Use where temporary vegetated cover is required.

#### **3.04 INSTALLATION**

- A. Straw Bale Rows:
  - 1. Install bales in continuous rows with ends butting tightly, with one bale at each end of row turned uphill.
  - 2. Install bales so that bindings are not in contact with the ground.
  - 3. Embed bales at least 4 inches in the ground.
  - 4. Anchor bales with at least two stakes per bale, driven at least 18 inches into the ground; drive first stake in each bale toward the previously placed bale to force bales together.
  - 5. Fill gaps between ends of bales with loose straw wedged tightly.
  - 6. Place soil excavated for trench against bales on the upslope side of the row, compacted.

- B. Temporary Seeding:
  - 1. When hydraulic seeder is used, seedbed preparation is not required.
  - 2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.
  - 3. If temporary mulching was used on planting area but not removed, apply nitrogen fertilizer at 1 pound per 1000 sq ft.
  - 4. Irrigate as required to thoroughly wet soil to depth that will ensure germination, without causing runoff or erosion.
  - 5. Repeat irrigation as required until grass is established.

**3.05 MAINTENANCE**

- A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.
- B. Repair deficiencies immediately.
- C. Straw Bale Rows:
  - 1. Promptly replace bales that fall apart or otherwise deteriorate unless need has passed.
  - 2. Remove silt deposits that exceed one-half of the height of the bales.
  - 3. Repair bale rows that are undercut by runoff or otherwise damaged, whether by runoff or other causes.
- D. Place sediment in appropriate locations on site; do not remove from site.

**3.06 CLEAN UP**

- A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Architect.
- B. Clean out temporary sediment control structures that are to remain as permanent measures.
- C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

**END OF SECTION**

**SECTION 01 6000**  
**PRODUCT REQUIREMENTS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Products
- B. Re-use of existing products.
- C. Transportation and handling.
- D. Storage and protection.
- E. Product options.
- F. Substitutions.

**1.02 PRODUCTS**

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- C. Provide interchangeable components of the same manufacturer, for similar components.

**1.03 TRANSPORTATION AND HANDLING**

- A. Transport and handle Products in accordance with manufacturer's instructions
- B. Promptly inspect shipments to assure that Products comply with requirements, quantities are correct, and Products are undamaged.
- C. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement, or damage.

**1.04 STORAGE AND PROTECTION**

- A. Store and protect Products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.
- B. For exterior storage of fabricated products, place on sloped supports, above ground.
- C. Provide off-site storage and protection when site does not permit on-site storage or protection.
- D. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
- E. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- F. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement, or damage.
- G. Arrange storage of Products to permit access for inspection. Periodically inspect to assure Products are undamaged and are maintained under specified conditions

**1.05 PRODUCT OPTIONS**

- A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.
- C. Products specified by naming only one Manufacturer is intended to establish the standard required. It is not intended to limit the selection of equal products of other manufacturers.

**1.06 SUBSTITUTIONS**

- A. Architect/Engineer will consider requests for Substitutions only within 30 days after date of Owner Contractor Agreement.
- B. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. A request constitutes a representation that the Contractor:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
  - 2. Will provide the same warranty for the Substitution as for the specified product.
  - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner
  - 4. Waives claims for additional costs or time extension which may subsequently become apparent.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- F. Substitution Submittal Procedure:
  - 1. Submit six copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
  - 2. Submit shop drawings, Product data, and certified test results attesting to the proposed product equivalence.
  - 3. The Architect/Engineer will notify Contractor, in writing, of decision to accept or reject request.

**PART 2 PRODUCTS**

**EXISTING PRODUCTS**

- A. -- NOT APPLICABLE --

**PART 3 EXECUTION**

- NOT APPLICABLE --

**END OF SECTION**

**SECTION 01 7000**  
**EXECUTION REQUIREMENTS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Cleaning and protection.
- F. Starting of systems and equipment.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 3000 - Submittals: Submittal procedures.
- B. Section 01 4500 - Quality Control: Testing and inspection procedures.
- C. Individual Product Specification Sections:
  - 1. Advance notification to other sections of openings required in work of those sections.
  - 2. Limitations on cutting structural members.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - "Submittals", for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.

**1.04 QUALIFICATIONS**

- A. For survey work, employ a land surveyor registered in the State of California and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

**1.05 PROJECT CONDITIONS**

- A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

**1.06 COORDINATION**

- A. Coordinate scheduling, submittals, and requirements of Section 01 30 00 - "Coordination" to ensure efficient and orderly sequence of installation of interdependent construction elements.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.



- E. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

## **PART 2 PRODUCTS**

**-- NOT APPLICABLE --**

### **2.01 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - PRODUCT REQUIREMENTS.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

### **3.02 PREPARATION**

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

### **3.03 PREINSTALLATION MEETINGS**

- A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
  - 1. Review conditions of examination, preparation and installation procedures.
  - 2. Review coordination with related work.
- E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

### **3.04 GENERAL INSTALLATION REQUIREMENTS**

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

### 3.05 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  - 1. Verify that construction and utility arrangements are as indicated.
  - 2. Report discrepancies to Architect before disturbing existing installation.
  - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Remove existing work as indicated and as required to accomplish new work.
  - 1. Remove items indicated on drawings.
  - 2. Relocate items indicated on drawings.
  - 3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
  - 4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
- C. Services (Including but not limited to HVAC, Plumbing, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
  - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
  - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
  - 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
    - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
    - b. Provide temporary connections as required to maintain existing systems in service.
  - 4. Verify that abandoned services serve only abandoned facilities.
  - 5. Remove abandoned pipe, ducts, conduits, and equipment; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- D. Protect existing work to remain.
  - 1. Prevent movement of structure; provide shoring and bracing if necessary.
  - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  - 3. Repair adjacent construction and finishes damaged during removal work.
- E. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
- F. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.
- G. Refinish existing surfaces as indicated:
  - 1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
  - 2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.

- H. Clean existing systems and equipment.
- I. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- J. Do not begin new construction in alterations areas before demolition is complete.
- K. Comply with all other applicable requirements of this section.

### **3.06 CUTTING AND PATCHING**

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- D. Employ experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. Patching:
  - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
  - 2. Match color, texture, and appearance.
  - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

### **3.07 PROGRESS CLEANING**

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

### **3.08 PROTECTION OF INSTALLED WORK**

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

### **3.09 SYSTEM STARTUP**

- A. Coordinate schedule for start-up of various equipment and systems.

- B. Notify Architect and owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- F. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

**3.10 ADJUSTING**

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

**END OF SECTION**

**SECTION 01 7419**  
**CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

**PART 1 GENERAL****1.01 WASTE MANAGEMENT REQUIREMENTS**

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, incineration, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.
- E. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.
- F. The following sources may be useful in developing the Waste Management Plan:
  - 1. State Recycling Department, at [calrecycle.ca.gov](http://calrecycle.ca.gov).
- G. Methods of trash/waste disposal that are not acceptable are:
  - 1. Burning on the project site.
  - 2. Burying on the project site.
  - 3. Dumping or burying on other property, public or private.
  - 4. Other illegal dumping or burying.
- H. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

**1.02 DEFINITIONS**

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.
- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

### 1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Waste Management Plan: Include the following information:
  - 1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
  - 2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
  - 3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
  - 4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
  - 5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
  - 6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.
- C. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
  - 1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
  - 2. Submit Report on a form acceptable to Owner.
  - 3. Landfill Disposal: Include the following information:
    - a. Identification of material.
    - b. Amount, in tons or cubic yards, of trash/waste material from the project disposed of in landfills.
    - c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
    - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
  - 4. Recycled and Salvaged Materials: Include the following information for each:
    - a. Identification of material, including those retrieved by installer for use on other projects.
    - b. Amount, in tons or cubic yards, date removed from the project site, and receiving party.
    - c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
    - d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
    - e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.
  - 5. Material Reused on Project: Include the following information for each:
    - a. Identification of material and how it was used in the project.
    - b. Amount, in tons or cubic yards.

- c. Include weight tickets as evidence of quantity.
- 6. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

## **PART 2 PRODUCTS**

### **2.01 PRODUCT SUBSTITUTIONS**

- A. See Section 01 6000 - Product Requirements for substitution submission procedures.
- B. For each proposed product substitution, submit the following information in addition to requirements specified in Section 01 6000:
  - 1. Relative amount of waste produced, compared to specified product.
  - 2. Cost savings on waste disposal, compared to specified product, to be deducted from the Contract Price.
  - 3. Proposed disposal method for waste product.
  - 4. Markets for recycled waste product.

## **PART 3 EXECUTION**

### **3.01 WASTE MANAGEMENT PROCEDURES**

- A. See Section 01 3000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
- B. See Section 01 7000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

### **3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION**

- A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
- B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.
- C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
- D. Meetings: Discuss trash/waste management goals and issues at project meetings.
  - 1. Pre-bid meeting.
  - 2. Pre-construction meeting.
  - 3. Regular job-site meetings.
- E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
  - 1. Provide containers as required.
  - 2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
  - 3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.
- F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.
- G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.
- H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.
- I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

### **END OF SECTION**

**SECTION 01 7700**  
**CLOSEOUT PROCEDURES**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. This section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:
  - 1. Inspection procedures for Completion Reviews.
  - 2. Final adjustments of accounts and payment.
  - 3. As-built drawings.
  - 4. Project record document submittal.
  - 5. Operation and maintenance manual submittal.
  - 6. Submittals and warranties.
  - 7. Final cleaning.
- B. Closeout requirements for specific construction activities are included in the appropriate individual sections. Should this section conflict with the General Conditions, the provision placing a more stringent requirement or greater burden on the Contractor or requiring the greater quantity or higher quality material or workmanship shall prevail, unless otherwise directed by the County.

**1.02 SUBSTANTIAL COMPLETION**

- A. Preliminary Procedures: Before requesting inspections for certification of Substantial Completion, complete the following:
  - 1. Conduct inspection to substantiate basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or non-conforming work, reason for being incomplete, and date of anticipated completion for each item.
  - 2. Advise the Owner of pending insurance changeover requirements.
  - 3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
  - 4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates and similar releases.
  - 5. Submit record drawings, maintenance manuals, damage or settlement surveys, property surveys and similar final record information.
  - 6. Deliver tools, spare parts, extra stock and similar items.
  - 7. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.
  - 8. Complete startup testing of systems and instructions of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools and similar elements.
  - 9. Complete final cleanup requirements, including touchup painting.
  - 10. Touch up and otherwise repair and restore marred, exposed finishes.

**1.03 FINAL COMPLETION REVIEW**

- A. Within 7 days after receipt of request for final review, Architect will make site review to determine whether Work is complete following procedures indicated in Conditions of the Contract.
- B. Should Architect consider Work to be incomplete or defective:
  - 1. Architect will promptly notify Contractor listing incomplete or defective work.
- C. Contractor shall take immediate steps to remedy stated deficiencies and send second written request to Architect the Work is complete.
  - 1. Architect will reinspect the Work.
  - 2. Revisits for Site Reviews:



- a. Should Architect have to re-perform site reviews due to failure of work to comply with claims of completion made by Contractor, Owner will reimburse Architect for such additional services and will deduct amount of compensation from final payment to Contractor.

#### **1.04 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS**

- A. Submit Contractor's affidavit of Payment of Debts and Claims on AIA Document G706.
- B. Submit Contractor's affidavit of Release of Liens on AIA Document G706A with:
  1. Consent of Surety to Final Payment: AIA G707.
  2. Contractor's Release of Waiver of Liens.
  3. Separate releases or waivers of liens from subcontractors, suppliers and others with lien rights against property of Owner, together with list of those parties.
- C. Execute Submittals before delivery to Owner.

#### **1.05 FINAL ADJUSTMENTS OF ACCOUNTS**

- A. Submit final statement of accounting to Architect.
- B. Show adjustments to Contract Sum:
  1. Original Contract Sum.
  2. Additions and deductions resulting from:
    - a. Previous Change Orders.
    - b. Allowances.
    - c. Unit prices.
    - d. Deductions for uncorrected work.
    - e. Deductions for inspection payments.
    - f. Other adjustments.
  3. Total Contract Sum.
  4. Previous Payments.
  5. Retainage.
  6. Sum remaining due.
- C. Architect will prepare final Change Order reflecting approved adjustments to Contract Sum which are not included in Change Orders previously processed.

#### **1.06 FINAL APPLICATION FOR PAYMENT**

- A. Submit final Application for Payment in accordance with procedures and requirements stated in Conditions of the Contract.

#### **1.07 RECORD DOCUMENT SUBMITTALS (AS-BUILTS)**

- A. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings. Mark the set to show the actual installation where installation varies substantially from the work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
  1. Mark record sets with red ink. Use other colors to distinguish between variations in separate categories of the work.
  2. Mark new information that is important to the Owner but was not shown on Contract Drawings.
- B. Maintenance Manuals: Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-inch, 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Furnish Architect with four (4) complete sets within 30 calendar days of initial Certificate of Occupancy. Mark appropriate identification on front and spine of each binder. Include the following types of information:
  1. Fixture lamping schedule.

- C. Spare Parts and Extra Stock Inventory: Transmit spare parts and extra stock to the Owner with an inventory checklist for review by the Owner. Checklist shall include an itemized listing of each type of item and quantity, a method for the Owner to check off each item accepted, and a receipt for the Owner to sign and return to the Contractor accepting the entire inventory.

## **PART 2 PRODUCTS**

-- NOT APPLICABLE --

## **PART 3 EXECUTION**

### **3.01 CLOSEOUT PROCEDURES**

- A. Operation and Maintenance Instructions: Arrange for each installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instructions by manufacturer's representatives if installers are not experienced in operation and maintenance procedures.
1. Include a detailed review of the following items:
    - a. Maintenance manuals.
    - b. Record documents.
    - c. Spare parts and manuals.
    - d. Tools.
    - e. Lubricants.
    - f. Fuels.
    - g. Identification systems.
    - h. Control sequences.
    - i. Hazards.
    - j. Cleaning.
    - k. Warranties and bonds.
    - l. Maintenance agreements and similar continuing commitments.
  2. As part of the instructions for operating equipment, demonstrate the following procedures:
    - a. Startup.
    - b. Shutdown.
    - c. Emergency operations.
    - d. Noise and vibration adjustments.
    - e. Safety procedures.
    - f. Economy and efficiency adjustments.
    - g. Effective energy utilization.
- B. Delivery of Spare Parts and Extra Stock: Deliver spare parts and extra stock to storage location designated by the Owner.

### **3.02 FINAL CLEANING**

- A. General: The General Conditions require general cleaning during construction. Regular site cleaning is included in Section 01 7000 - "Execution Requirements".
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
- C. Removal of Protection: Remove temporary protection and facilities installed for protection of the work during construction.
- D. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site as directed by the Owner.

1. Where extra materials of value remain after completion of associated work, they become the Owner's property. Dispose of these materials as directed by the Owner.

**END OF SECTION**

**SECTION 03 3000**  
**CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Concrete formwork.
- B. Floors and slabs on grade.
- C. Concrete foundations and anchor bolts for pre-engineered building.
- D. Concrete reinforcement.
- E. Miscellaneous concrete elements, including equipment pads and light pole bases.
- F. Concrete curing.

**1.02 RELATED REQUIREMENTS**

- A. Section 13 3419 - Metal Building Systems: Concrete foundations and slabs.
- B. Section 32 1313 - Concrete Paving: Sidewalks, curbs and gutters.

**1.03 REFERENCE STANDARDS**

- A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.
- B. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
- C. ACI 302.1R - Guide for Concrete Floor and Slab Construction; 2004 (Errata 2007).
- D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000.
- E. ACI 305R - Hot Weather Concreting; 2010.
- F. ACI 308R - Guide to Curing Concrete; 2001 (Reapproved 2008).
- G. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
- H. ACI 347R - Guide to Formwork for Concrete; 2014.
- I. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.
- J. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2015.
- K. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2013.
- L. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2015a.
- M. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2015.
- N. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.
- O. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.
- P. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2014.
- Q. ASTM C1116/C1116M - Standard Specification for Fiber-Reinforced Concrete; 2010a (Reapproved 2015).
- R. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover; 2008a (Reapproved 2013).
- S. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2011.
- T. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2011.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Mix Design: Submit proposed concrete mix design.
  - 1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
  - 2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.

**1.05 QUALITY ASSURANCE**

- A. Perform work of this section in accordance with ACI 301 and ACI 318.

**PART 2 PRODUCTS****2.01 FORMWORK**

- A. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.

**2.02 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
- B. Steel Welded Wire Reinforcement (WWR): Galvanized, plain type, ASTM A1064/A1064M.

**2.03 CONCRETE MATERIALS**

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
  - 1. Acquire cement for entire project from same source.
- B. Fine and Coarse Aggregates: ASTM C 33.
  - 1. Acquire aggregates for entire project from same source.
- C. Water: Clean and not detrimental to concrete.
- D. Admixtures: Fly ash, calcium chloride or other admixtures are Not Allowed.
- E. Structural Fiber Reinforcement: ASTM C1116/C1116M.
  - 1. Fiber Type: Alkali-resistant polypropylene.
  - 2. Fiber Length: 1.5 inch, nominal.

**2.04 ACCESSORY MATERIALS**

- A. Underslab Vapor Barrier shall have all of the following qualities:
  - 1. Maintain permeance of less than 0.01 Perms [grains/(ft<sup>2</sup> ? hr ? inHg)] as tested in accordance with mandatory conditioning tests per ASTM E1745 Section 7.1 (7.1.1-7.1.5).
  - 2. Other performance criteria:
    - a. Strength: ASTM E1745 Class A.
    - b. Thickness: 15 mils minimum
- B. Vapor barrier products:
  - 1. Basis of Design: Stego Wrap Vapor Barrier (15-mil) by Stego Industries LLC., (877) 464-7834 [www.stegoindustries.com](http://www.stegoindustries.com) <<http://www.stegoindustries.com>>.
    - a. Approved Alternate: Vaporguard by Reef Industries, 713-507-4250. [www.reefindustries.com](http://www.reefindustries.com) <<http://www.reefindustries.com>>.
    - b. Approved Alternate: PMPC by WR Meadows, 800-342-5976. <<http://www.wrmeadows.com/pmpc/>>
  - 2. Accessory products:
    - a. Seam Tape
    - b. Perimeter/terminated edge seal
    - c. Penetration Prevention
    - d. Vapor Barrier-Safe Screed System
- C. Form Release Agent: Material which will not stain concrete or absorb moisture.
- D. Sealer:

1. Westcoat Specialty Coating Systems, 770 Gateway Center Drive - San Diego, CA 92102. (800) 250-4519 / www.westcoat.com.
  - a. EC-95 Polyurethane Topcoat (use as sealer).
    - 1) Two (2) coats.
2. Apply in strict conformance with manufacturer's instructions.
3. Substitutions: See Section 01 6000 - PRODUCT REQUIREMENTS.

#### **2.05 CONCRETE MIX DESIGN**

- A. Fiber Reinforcement: Add to mix at rate of 1.5 pounds per cubic yard, or as recommended by manufacturer for specific project conditions.
- B. Normal Weight Concrete:
  1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,500 pounds per square inch.
  2. Maximum Slump: 3 inches.

#### **2.06 MIXING**

- A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
  1. Fiber Reinforcement: Batch and mix as recommended by manufacturer for specific project conditions.
- B. Transit Mixers: Comply with ASTM C94/C94M.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify lines, levels, and dimensions before proceeding with work of this section.

#### **3.02 PREPARATION**

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
  1. Install vapor barrier in accordance ASTM E1643.
  2. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as indicated on the drawings. Do not use sand.

#### **3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS**

- A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

#### **3.04 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
- B. Notify Architect not less than 24 hours prior to commencement of placement operations.
- C. Prepare base directly under concrete slabs smooth and compacted. No sharp gravel or protrusions permitted. Compacted sand over base is acceptable to smooth base prior to installation of vapor barrier. Sand or granular fill over vapor barrier is prohibited.
- D. No penetration of vapor barrier permitted.
- E. Prior to pouring, remove standing water by powered blower or other suitable means.

#### **3.05 SLAB JOINTING**

- A. Locate joints as indicated on the drawings.

- B. Anchor joint fillers and devices to prevent movement during concrete placement.
- C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
- D. Saw Cut Control joints immediately following the finishing process and prior to the placement of curing cover or membrane.
- E. Cut slabs with 3/16-inch thick blade, cut at least 1" deep but not less than 1/4 of depth of slab thickness.

### **3.06 CONCRETE FINISHING**

- A. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
  - 1. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include resilient flooring.
  - 2. Light broom finish at Apparatus Bays
  - 3. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
- B. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains as indicated on drawings.

### **3.07 CURING AND PROTECTION**

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

### **3.08 DEFECTIVE CONCRETE**

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

### **3.09 PROTECTION**

- A. Do not permit traffic over unprotected concrete floor surface until fully cured.

**END OF SECTION**

**SECTION 05 4000**  
**COLD-FORMED METAL FRAMING**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Formed steel stud interior wall framing.
- B. Formed steel joist framing and bridging.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 2100 - Thermal Insulation: Insulation within framing members.
- B. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

**1.03 REFERENCE STANDARDS**

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2012.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- D. ASTM C955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases; 2011c.
- E. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2011a.
- F. PS 1 - Structural Plywood; 2009.
- G. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.
- C. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.

**1.05 QUALITY ASSURANCE**

- A. Designer Qualifications: Design framing system under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Metal Framing:
  - 1. CEMCO; -: [www.cemcosteel.com](http://www.cemcosteel.com).
  - 2. ClarkDietrich Building Systems; -: [www.clarkdietrich.com](http://www.clarkdietrich.com).
  - 3. Substitutions: See Section 01 6000 - PRODUCT REQUIREMENTS.
- B. Framing Connectors and Accessories:
  - 1. Same manufacturer as metal framing.



2. Substitutions: See Section 01 6000 - PRODUCT REQUIREMENTS.

## **2.02 FRAMING SYSTEM**

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
- B. Design Criteria: Provide completed framing system having the following characteristics:
  1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S100-12.
  2. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
  3. Design Loads: In accordance with applicable codes.
  4. Live load deflection meeting the following, unless otherwise indicated:
  5. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
  6. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

## **2.03 FRAMING MATERIALS**

- A. Studs and Track: ASTM C955; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height.
  1. Gage and Depth: As indicated on the drawings.
- B. Joists and Purlins: Fabricated from ASTM A653/A653M steel sheet, with G90/Z275 hot dipped galvanized coating.
  1. Base Metal: Structural Steel (SS), Grade 33/230.
  2. Gage and Depth: As indicated on the drawings.

## **2.04 ACCESSORIES**

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B. Plates, Gussets, Clips: Formed Sheet Steel, thickness determined for conditions encountered; finish to match framing components.
- C. Backing: Formed sheet steel, thickness determined for conditions encountered, finish to match framing.
- D. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

## **2.05 FASTENERS**

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
- B. Anchorage Devices: Powder actuated.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify field measurements and adjust installation as required.

### **3.02 INSTALLATION OF STUDS**

- A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.

### **3.03 INSTALLATION OF JOISTS AND PURLINS**

- A. Install framing components in accordance with manufacturer's instructions.
- B. Make provisions for erection stresses. Provide temporary alignment and bracing.

**3.04 WALL SHEATHING**

- A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.

**END OF SECTION**

**SECTION 05 5000**  
**METAL FABRICATIONS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Shop fabricated ferrous metal items, galvanized and prime painted.

**1.02 RELATED REQUIREMENTS**

- A. Section 09 9113 - Exterior Painting: Paint finish.
- B. Section 09 9000 - Painting and Coating

**1.03 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.
- D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- E. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.
- F. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.
- G. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- H. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions; 2015a.
- I. AWS A2.0 - Standard Welding Symbols.
- J. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - "Submittals", for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
- C. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

**1.05 FIELD MEASUREMENTS**

- A. Verify that field measurements are as indicated on Drawings.

**PART 2 PRODUCTS****2.01 MATERIALS - STEEL**

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A500/A500M, Grade B cold-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Slotted Channel Framing: ASTM A653/A653M, Grade 33.

- F. Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, plain.
- G. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- H. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- I. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

## **2.02 FABRICATION**

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

## **2.03 FABRICATED ITEMS**

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- B. Door Frames for Overhead Door Openings: Channel sections; prime paint finish.

## **2.04 FINISHES - STEEL**

- A. Prime paint steel items.
  - 1. Exceptions: Galvanize items to be embedded in concrete and items to be embedded in masonry.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: Two coats.
- E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements. Provide minimum 1.7 oz/sq ft galvanized coating.
- F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Beginning of installation means erector accepts existing conditions.

### **3.02 PREPARATION**

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

### **3.03 INSTALLATION**

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Field weld components as indicated on drawings.

- D. Perform field welding in accordance with AWS D1.1/D1.1M.
- E. Obtain Architect/Engineer approval prior to site cutting or making adjustments not scheduled.

**3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

**3.05 SCHEDULE**

- A. The Schedule is a list of principal items only. Refer to drawing details for items not specifically scheduled.
- B. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; galvanized finish.
- C. Trash Enclosure Gates: As detailed.
- D. Trash Enclosure Metal Canopy

**END OF SECTION**

**SECTION 07 2100  
THERMAL INSULATION**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Batt insulation in exterior wall and roof construction.

**1.02 RELATED REQUIREMENTS**

- A. Section 09 2116 - Gypsum Board Assemblies: Acoustic insulation inside walls and partitions.

**1.03 REFERENCE STANDARDS**

- A. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013.
- B. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- D. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2012.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Thermal Insulation:
  - 1. Bay Insulation of California, Fresno, CA Ph: 559-268-6330
  - 2. Owens Corning
  - 3. Certainteed
  - 4. Substitutions: See Section 01 6000 - PRODUCT REQUIREMENTS.

**2.02 APPLICATIONS**

- A. Insulation in Metal Framed Walls: Batt insulation with no vapor retarder.
- B. Metal Building Insulation at roof

**2.03 BATT INSULATION MATERIALS**

- A. Where batt insulation is indicated, either glass fiber or mineral fiber batt insulation may be used, at Contractor's option.
- B. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
  - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
  - 2. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
  - 3. Thermal Resistance:
    - a. R of 30 at underside of roof
    - b. R of 19 at gypsum board walls
  - 4. Facing: white polypropylene.
    - a. WMP-VR at roof and where exposed

**2.04 ACCESSORIES**

- A. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
  - 1. Length as required for thickness of insulation material and penetration of deck substrate.

- B. Adhesive: Type recommended by insulation manufacturer for application.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

#### **3.02 BATT INSTALLATION**

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
- F. Tape insulation batts in place.
- G. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
- H. At metal framing, place vapor retarder on warm side of insulation; lap and seal sheet retarder joints over member face.
- I. Tape seal tears or cuts in vapor retarder.
- J. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.

**END OF SECTION**

**SECTION 07 9005  
JOINT SEALERS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Sealants and joint backing.

**1.02 RELATED REQUIREMENTS**

- A. Section 09 2116 - Gypsum Board Assemblies: Acoustic sealant.

**1.03 REFERENCE STANDARDS**

- A. ASTM C834 - Standard Specification for Latex Sealants; 2014.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- D. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2005 (Reapproved 2010).
- E. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics.

**1.05 FIELD CONDITIONS**

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

**PART 2 PRODUCTS****2.01 SEALANTS**

- A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- B. General Purpose Exterior Sealant: Acrylic, solvent release curing; ASTM C920, Grade NS, Class 12-1/2, Uses M, G, and A; single or multi- component.
  - 1. Color: Match adjacent finished surfaces.
  - 2. Applications: Use for:
    - a. Control, expansion, and soft joints in masonry.
    - b. Joints between concrete and other materials.
    - c. Joints between metal frames and other materials.
    - d. Other exterior joints for which no other sealant is indicated.
  - 3. Products:
    - a. Red Devil; Siliconized Acrylic Construction Grade (35 Year) Sealant: [www.reddevil.com](http://www.reddevil.com).
    - b. Sherwin-Williams Company; Shermax Urethanized Elastomeric Sealant: [www.sherwin-williams.com](http://www.sherwin-williams.com).
    - c. Substitutions: See Section 01 6000 - PRODUCT REQUIREMENTS.
- C. Exterior Expansion Joint Sealer: Precompressed foam sealer; urethane with water-repellent;
  - 1. Face color: Match adjacent finished surface.
  - 2. Size as required to provide weathertight seal when installed.
  - 3. Products:
    - a. Tremco Global Sealants; -: [www.tremcosealants.com](http://www.tremcosealants.com).
    - b. Substitutions: See Section 01 6000 - PRODUCT REQUIREMENTS.
- D. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
  - 1. Color: Match adjacent finished surfaces.



2. Products:
  - a. Bostik Inc; : [www.bostik-us.com](http://www.bostik-us.com).
  - b. Substitutions: See Section 01 6000 - PRODUCT REQUIREMENTS.
- E. Concrete Floor Joint Filler: Self-leveling, pourable, semi-rigid sealant intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
  1. Composition: Single or multi-part, 100 percent solids by weight.
  2. Hardness: 85 after 7 days, when tested in accordance with ASTM D2240 Shore A.
  3. Color: Concrete gray.
  4. Joint Width: 1/8 inch.
  5. Joint Depth: Provide product suitable for joints from 1/8 inch to 2 inches in depth including space for backer rod.
  6. Products:
- F. Concrete Paving Joint Sealant: Polyurethane, self-leveling; ASTM C920, Class 25, Uses T, I, M and A; single component.
  1. Color: Gray.
  2. Applications: Use for:
    - a. Joints in sidewalks and vehicular paving.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

#### **3.02 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

#### **3.03 INSTALLATION**

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave.
- H. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.
- I. Concrete Floor Joint Filler: Install concrete floor joint filler per manufacturer's written instructions. After floor joint filler is fully cured, shave joint filler flush with top of concrete slab.

#### **3.04 CLEANING**

- A. Clean adjacent soiled surfaces.

**3.05 PROTECTION**

- A. Protect sealants until cured.

**END OF SECTION**

**SECTION 08 1113  
HOLLOW METAL DOORS AND FRAMES**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Non-fire-rated hollow metal doors and frames.
- B. Thermally insulated hollow metal doors with frames.
- C. Accessories, including glazing, louvers, and matching panels.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 7100 - Door Hardware.
- B. Section 09 9000 - Painting and Coatings

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- D. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames; 2003 (R2009).
- E. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
- F. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- H. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.
- I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2014.
- J. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.
- K. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.
- L. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2006.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- C. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Maintain at project site copies of reference standards relating to installation of products specified.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

**PART 2 PRODUCTS****2.01 DESIGN CRITERIA**

- A. Requirements for Hollow Metal Doors and Frames:
  - 1. Steel used for fabrication of doors and frames shall comply with one or more of the following requirements; Galvannealed steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.
  - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
- B. Hollow Metal Panels: Same construction, performance, and finish as doors.
- C. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

**2.02 HOLLOW METAL DOORS**

- A. Exterior Doors: Thermally insulated.
  - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 2 - Heavy-duty.
    - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 16 gage, 0.053 inch, minimum.
  - 2. Core Material: Manufacturers standard core material/construction and in compliance with requirements.
  - 3. Door Thickness: 1-3/4 inch, nominal.
  - 4. Top Closures for Outswinging Doors: Flush with top of faces and edges.
  - 5. Weatherstripping: Refer to Section 08 7100.
  - 6. Door Finish: Factory primed and field finished.
- B. Interior Doors, Non-Fire Rated:
  - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 2 - Heavy-duty.
    - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Door Face Metal Thickness: 16 gage, 0.053 inch, minimum.
  - 2. Core Material: Impregnated cardboard honeycomb.
  - 3. Door Thickness: 1-3/4 inch, nominal.
  - 4. Texture: Smooth faces.
  - 5. Door Finish: Factory primed and field finished.

**2.03 HOLLOW METAL FRAMES**

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. General:
  - 1. Comply with the requirements of grade specified for corresponding door.
    - a. ANSI A250.8 Level 1 Doors: 16 gage frames.
  - 2. Finish: Same as for door.
- C. Exterior Door Frames: Face welded type.
  - 1. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.

2. Weatherstripping: Separate, see Section 08 7100.

D. Interior Door Frames, Non-Fire Rated: Full profile/continuously welded type.

#### **2.04 ACCESSORIES**

A. Louvers: Roll formed steel with overlapping frame; finish same as door components.

1. Style: Sightproof inverted V blade.

2. Louver Free Area: 50 percent.

B. Glazing: Type F Wire Glass, 1/2" grid, 1/4" thick.

C. Removable Stops: Formed sheet steel, mitered or butted corners; prepared for countersink style tamper proof screws.

D. Astragals for Double Doors: Specified in Section 08 7100.

#### **2.05 FINISHES**

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

#### **3.02 PREPARATION**

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

#### **3.03 INSTALLATION**

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Coordinate frame anchor placement with wall construction.

C. Install door hardware as specified in Section 08 7100.

1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.

#### **3.04 TOLERANCES**

A. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

#### **3.05 ADJUSTING**

A. Adjust for smooth and balanced door movement.

**END OF SECTION**

**SECTION 08 3323  
OVERHEAD COILING DOORS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Accelerated Action overhead coiling doors, operating hardware, and electric operation.
- B. Wiring from electric circuit disconnect to operator to control station.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.
- B. Section 26 0533 - Conduit for Electrical Systems: Conduit from electric circuit to operator and from operator to control station.
- C. Section 26 2726 - Wiring Devices: Power to disconnect.

**1.03 REFERENCE STANDARDS**

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- C. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts; 2000 (R2005), with errata, 2008.

**1.04 SYSTEM DESCRIPTION**

- A. Electric motor operated unit with manual override in case of power failure.
- B. Within a framed opening. Surface mounted.

**1.05 DESIGN REQUIREMENTS**

- A. Design door assembly to satisfy non-operational Design Wind Speed of 135 MPH without undue deflection or damage to door or assembly components.
  - 1. Design for model 418 Curved/Flat Slat (14'x14') to satisfy non-operational Design Wind Speed of 135 MPH without undue deflection or damage to door or assembly components. In the event of high sustained wind load, use auxiliary chain hoist to open door

**1.06 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide general construction, electrical equipment, and component connections and details.
- C. Shop Drawings: Indicate pertinent dimensioning, anchorage methods, hardware locations, and installation details.
- D. Maintenance Data: Indicate lubrication requirements and frequency and periodic adjustments required.

**1.07 FIELD MEASUREMENTS**

- A. Verify that field measurements are as indicated.

**PART 2 PRODUCTS****2.01 ACCEPTABLE MANUFACTURERS**

- A. Overhead Coiling Doors:
  - 1. Porvene Doors, Inc.: [www.porvenedoors.com](http://www.porvenedoors.com).
    - a. Model 418/ Accelerated Action System with chain override.
  - 2. Or approved equal.
  - 3. Substitutions: See Section 01 6000 - PRODUCT REQUIREMENTS.

**2.02 MATERIALS**

- A. Curtain: conform to the following:

1. Slat: Interlocking, minimum 18-gauge of ANSI/ASTM A653 steel, galvanized to minimum 1.25 oz/sq ft coating in accordance with ASTM A924. Cold roll formed in continuous lengths of 18 ga..
  2. Slat Ends: Each slat fitted with end locks to act as wearing surface in guides and to prevent lateral movement.
  3. Vision Lites: Two (2) rows of vision cutouts through curtain covered with clear Lexan polycarbonate. Mount as indicated on drawings.
  4. Curtain Bottom: Fitted with angles to provide reinforcement and positive contact in closed position.
  5. Wear Straps: Polyester bands fitted vertically 1 per every 5 foot of curtain width.
- B. Guide Construction: Two angles form a curtain guide and are bolted to a continuous wall angle. Sizes of structural steel angles are determined as required to retain curtain in guides under wind load and provide adequate mounting to jambs.
1. Provide structural 3-Pc. guides with malleable windlocks.
- C. Hood Enclosure: 24-gauge galvanized steel; Internally reinforced to maintain rigidity and shape.
- D. Lock Hardware:
- E. Roller Shaft Counterbalance: Steel pipe and helical steel spring system, capable of producing torque sufficient to ensure smooth operation of curtain from any position and capable of holding position at mid-travel; with adjustable spring tension; requiring 25 lb nominal force to operate.

### 2.03 FINISHES

- A. Curtain Slats: Standard baked epoxy primer and baked polyester topcoat.
- B. Steel Guides and Hood Enclosure: Baked enamel prime coat factory finish. No field painting allowed.

### 2.04 FABRICATION

- A. Endlocks: Each end of alternate slats shall be fitted with endlocks to provide a wearing surface in the guides and to maintain slat alignment. Fastened with 1/4 inch rivets.
1. Malleable Iron End-Locks: Malleable or "cast" iron end-locks shall be fitted onto every other slat.
- B. Bottom Bar: Curtain shall be reinforced with a bottom bar consisting of two 2 inch by 2 inch by 1/8 inch (50.8mm by 50.8mm by 3.21mm) structural steel angle with P.V.C. bulb astragal.
- C. Barrel: Shall be a steel pipe of diameter and wall thickness to restrict maximum deflection to 0.03 inch per foot (2.5mm/m) of door width. End bearings shall be self-lubricating ball bearings.
- D. D. Springs: Shall be oil tempered, grease packed helical torsion type designed with an overload factor of 25 percent. Springs mounted on a cold rolled steel inner shaft.
1. High Cycle Springs: spring design is to last at least 50,000 cycles.
- E. E. Bracket Plates: 1/4 inch (6mm) minimum thickness steel plates to sustain and enclose ends of the door assembly.
- F. Drive end bracket plate: Fitted with a self-aligning sealed ball bearing.
- G. Guides: Shall be structural steel angles 3/16 inch (4.76mm) minimum thickness with removable head stops.
1. Provide weather seal clip-on vinyl or weather stripping to seal against slat.
- H. Guide Wall Angles: 3/16 inch (4.76mm) minimum thickness structural steel angles.
- I. Hoods: Shall be 24 gauge galvanized still with baked epoxy primer. No field painting allowed.

### 2.05 ELECTRIC OPERATION

- A. Electric Operators:
1. Gear hoist door operator, Model Pro-GH VFD with Red/Green warning light modification as manufactured by Micanan (or approved equal); 1.5 HP, 110 volt, single phase, mounted in accordance with manufacturer's specifications. Provide push button stations (interior) with radio control option.

2. Provide two (2) transmitters per door.
  3. Brake: Adjustable friction clutch type, activated by motor controller.
  4. Manual override in case of power failure.
- B. Interior Control Station: Recessed, standard three button (open-close-stop) control for each operator; 24 volt circuit. (NEMA 250, Type 4).
- C. Commercial Protector System (CPS):
1. Provide "non-contact" photo safety sensors designed to sense an obstruction between jambs and signals for the door operator to reverse to open. (NEMA 250, Type 4).
- D. Safety Edge: Located at bottom of curtain, full width, electro-mechanical sensitized type, wired to stop operator upon striking object, hollow neoprene covered.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that opening sizes, tolerances and conditions are acceptable.

#### **3.02 INSTALLATION**

- A. Install units in accordance with manufacturer's instructions.
- B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
- C. Securely and rigidly brace components suspended from structure. Secure guides to structural members only.
- D. Fit and align assembly including hardware; level and plumb, to provide smooth operation.
- E. Complete wiring from disconnect to unit components.

#### **3.03 TOLERANCES**

- A. Maintain dimensional tolerances and alignment with adjacent work.
- B. Maximum Variation From Plumb: 1/16 inch.
- C. Maximum Variation From Level: 1/16 inch.
- D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch per 10 ft straight edge.

#### **3.04 ADJUSTING**

- A. Adjust operating assemblies for smooth and noiseless operation.

#### **3.05 CLEANING**

- A. Clean installed components / under provisions of Division 1.
- B. Remove labels and visible markings.

**END OF SECTION**



**SECTION 08 7100  
DOOR HARDWARE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Hardware for hollow metal doors.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 1113 - Hollow Metal Doors and Frames.

**1.03 REFERENCE STANDARDS**

- A. 36 CFR 1191 - Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities; Final Rule; current edition; (ADA Standards for Accessible Design).
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- D. CBC - 2016 California Building Code, based on 2015 International Building Code (IBC), with California Amendments.
- E. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.
- F. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2016.
- G. NFPA 101 - Life Safety Code; 2015.
- H. SDI - Steel Door Institute.

**1.04 COORDINATION**

- A. Coordinate the manufacture, fabrication, and installation of products that door hardware will be installed upon.
- B. Coordinate work of this section with other directly affected sections involving manufacturer of any internal reinforcement for door hardware.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - "Submittals", for submittal procedures.
- B. Indicate locations and mounting heights of each type of hardware.
- C. Submit Schedule of Hardware.
- D. Provide product data on specified hardware.

**1.06 OPERATION AND MAINTENANCE DATA**

- A. Submit operation and maintenance data.
- B. Include data on operating hardware, lubrication requirements, and inspection procedures related to preventive maintenance.

**1.07 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Hardware Supplier Qualifications: Company specializing in supplying the type of products specified in this section with at least three years documented experience.

**1.08 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store and protect products under provisions of Section 01 60 00 - "Product Requirements"
- B. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.
- C. Deliver keys to Owner by security shipment direct from hardware supplier.

- D. Protect hardware from theft by cataloging and storing in secure area.

#### **1.09 MAINTENANCE PRODUCTS**

- A. Provide special wrenches and tools applicable to each different or special hardware component.
- B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

#### **1.10 WARRANTY**

- A. Provide five year warranty.

### **PART 2 PRODUCTS**

#### **2.01 GENERAL REQUIREMENTS**

- A. Provide door hardware specified, or as required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.
- B. Provide items of a single type of the same model by the same manufacturer.
- C. Provide products that comply with the following:
  - 1. Applicable provisions of federal, state, and local codes.
  - 2. Accessibility: ADA Standards and ICC A117.1.
  - 3. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.
  - 4. Applicable provisions of NFPA 101, Life Safety Code.

#### **2.02 LOCKS AND LATCHES**

- A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
  - 1. If no hardware set is indicated for a swinging door provide an office lockset.
  - 2. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
  - 3. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
- B. Lock Cylinders: Manufacturer's standard tumbler type, six-pin standard core.
  - 1. Provide cams and/or tailpieces as required for locking devices required.
- C. Keying: Grand master keyed.
  - 1. Include construction keying.
- D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

#### **2.03 HINGES**

- A. Refer to Hardware Sets at end of section.
- B. Hinges: Provide hinges on every swinging door.
  - 1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
  - 2. Provide ball-bearing hinges at all doors having closers.
  - 3. Provide hinges in the quantities indicated.
  - 4. Provide non-removable pins on exterior outswinging doors.
  - 5. Where electrified hardware is mounted in door leaf, provide power transfer hinges.

#### **2.04 KEYING**

- A. Door Locks: Construction keying only. The Owner to provide key system compatible with the 5 pin system after acceptance of the building.
- B. Supply two (2) keys for each lock.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.
- B. Verify that electric power is available to power operated devices and of the correct characteristics.
- C. Beginning of installation means acceptance of existing conditions.

**3.02 INSTALLATION**

- A. Install hardware in accordance with manufacturer's instructions, requirements of SDI and applicable codes.
- B. Use templates provided by hardware item manufacturer.
- C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.
- D. Conform to ANSI A117.1 for positioning requirements for the handicapped.

**3.03 SCHEDULE**

- A. Numbers have been taken from the following:  
HAG -Hager HingeNOR -NortonPEM -PemkoTRM - TrimcoYALE -YaleGJ - Glenn Johnson

Jack Lindgren Builders' Hardware Inc  
6531 Brockton Avenue  
Riverside, California 92506  
Phone: 951-684-6134

**HDG #1**

Drs. #1 EACH DOOR TO HAVE

3 Ea	Hinge	BB1279	4.5 x 4.5	NRP	652	IVE
1 Ea	Lockset	5418 LN-AU			689	YALE
1 Ea	Closer	8501			689	NOR
1 Ea	Stop	1214-ES			626	TRM
1 Ea	Threshold	2727A				PMK
1 Ea	Dr Sweep	3452ANB			628	PMK
1 Set	Dr Seal	S88D				PMK
1 Set	Signage	As Req.				

**HDG #2**

Drs. #9 DOORS TO HAVE

3 Ea	Hinge	BB1279	4.5 x 4.5	NRP	652	IVE
1 Ea	Privacy	5402LN-AU			626	YALE
1 Ea	Stop	1211-ES			626	TRM
1 Set	Signage	As Req.				

**HDG #3**

Drs. #4, #5 EACH PAIR OF DOORS TO HAVE

6 Ea	Hinge	BB1279	4.5 x 4.5	NRP	652	IVE
1 Ea	Lockset	5405LN-AU			626	YALE
1 Ea	*Stop	1211-ES			626	TRM
1 Ea	Threshold	272A				PMK
1 Ea	Auto Dr Bottom		434ARL			PMK
1 Set	Dr Seal	S88D				PMK

\* Stop not required at Door #5

**HDG #4**

Drs. #10,11, 12, 13 EACH DOOR TO HAVE

3 Ea	Hinge	BB1279	4.5 x 4.5	NRP	652	IVE
1 Ea	Lockset	5418 LN-AU			689	YALE
1 Ea	Stop	1211-ES			626	TRM

**HDG #5**

Drs. #8 EACH DOOR TO HAVE

3 Ea	Hinge	BB1279	4.5 x 4.5	NRP	652	IVE
1 Ea	Lockset	5405 LN-AU			689	YALE
1 Ea	Stop	1211-ES			626	TRM

**END OF SECTION**

**SECTION 08 9100  
LOUVERS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Louvers, frames, and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 6200 - SHEET METAL FLASHING AND TRIM.
- B. Section 09 9000 - Painting and Coating

**1.03 REFERENCE STANDARDS**

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2013.
- B. AMCA 511 - Certified Ratings Program for Air Control Devices; 2010.
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Ruskin, 3900 Dr Greaves Rd., Kansas City, MO 64030, Ph: 816-761-7476. Web site: [www.ruskin.com](http://www.ruskin.com)

**2.02 LOUVERS**

- A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
- B. Drainable Stationary Louver: Ruskin.
  - 1. Model L6375D Stationary Roll Formed Steel. Size as indicated on plans.
  - 2. Net free area 50% min.
  - 3. Extended sill where required.
  - 4. Provide bird screen

**2.03 MATERIALS**

- A. Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G60/Z180 coating.

**2.04 FINISHES**

- A. Superior Performing Organic Coatings: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system.
  - 1. Polyvinylidene fluoride (PVDF) multi-coat thermoplastic fluoropolymer coating system, including minimum 70 percent PVDF color topcoat and minimum total dry film thickness of 0.9 mil; color and gloss as selected from manufacturer's standard line.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.

**3.02 INSTALLATION**

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Install louvers level and plumb.

- C. Align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- D. Secure louver frames in openings with concealed fasteners.

**END OF SECTION**

**SECTION 09 2116**  
**GYPSUM BOARD ASSEMBLIES**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Performance criteria for gypsum board assemblies.
- B. Metal stud wall framing.
- C. Gypsum wallboard.
- D. Joint treatment and accessories.
- E. Textured finish system.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 4000 - Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing.
- B. Section 07 2100 - Thermal Insulation: Acoustic insulation.
- C. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.

**1.03 REFERENCE STANDARDS**

- A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- B. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014.
- C. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015.
- D. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.
- E. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.
- F. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- G. GA-216 - Application and Finishing of Gypsum Board; 2013.
- H. ICC (IBC) - International Building Code; 2015.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on gypsum board, accessories, and joint finishing system.

**PART 2 PRODUCTS****2.01 GYPSUM BOARD ASSEMBLIES**

- A. Provide completed assemblies complying with ASTM C840 and GA-216.

**2.02 METAL FRAMING MATERIALS**

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
  - 1. Cemco: [www.cemcosteel.com](http://www.cemcosteel.com)
  - 2. Clarkwestern Dietrich Building Systems LLC; \_\_\_\_: [www.clarkdietrich.com](http://www.clarkdietrich.com).
  - 3. Substitutions: See Section 01 6000 - PRODUCT REQUIREMENTS.
- B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.
  - 1. Studs: "C" shaped with flat or formed webs with knurled faces.
  - 2. Runners: U shaped, sized to match studs.
  - 3. Ceiling Channels: C-shaped.

**2.03 BOARD MATERIALS**

- A. Manufacturers - Gypsum-Based Board:
  - 1. CertainTeed Corporation; : [www.certainteed.com](http://www.certainteed.com).
  - 2. Georgia-Pacific Gypsum; : [www.gpgypsum.com](http://www.gpgypsum.com).
  - 3. PABCO Gypsum; : [www.pabcogypsum.com](http://www.pabcogypsum.com).
  - 4. USG Corporation; : [www.usg.com](http://www.usg.com).
  - 5. Substitutions: See Section 01 6000 - PRODUCT REQUIREMENTS.
- B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
  - 2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
    - a. Mold resistant board is required at washing machine and mop sink areas..
  - 3. At all locations use Type X board, UL or WH listed.
  - 4. Thickness:
    - a. Vertical Surfaces: 1/2 inch.
    - b. Ceilings: 5/8 inch.
- C. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  - 1. Application: Ceilings, unless otherwise indicated.
  - 2. Thickness: 5/8 inch.
  - 3. Edges: Tapered.

**2.04 ACCESSORIES**

- A. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
  - 1. Types: As detailed or required for finished appearance.
- B. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
  - 1. Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
  - 2. Ready-mixed vinyl-based joint compound.
- C. Textured Finish Materials: Latex-based compound; plain.
- D. Screws for Fastening of Gypsum Panel Products to Steel Members from 0.033 to 0.112 inch in Thickness: ASTM C954; steel drill screws, corrosion resistant.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify that project conditions are appropriate for work of this section to commence.

**3.02 FRAMING INSTALLATION**

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as permitted by standard.
- C. Studs: Space studs at 16 inches on center.
  - 1. Extend partition framing to structure where indicated and to ceiling in other locations.
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- E. Blocking: Install mechanically fastened steel sheet blocking for support of:
  - 1. Framed openings.
  - 2. Wall mounted cabinets.
  - 3. Plumbing fixtures.
  - 4. Wall mounted door hardware.



**3.03 BOARD INSTALLATION**

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
- C. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.
- D. Installation on Metal Framing: Use screws for attachment of gypsum board.

**3.04 INSTALLATION OF TRIM AND ACCESSORIES**

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
  - 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

**3.05 JOINT TREATMENT**

- A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
  - 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
  - 2. Level 3: Walls to receive textured wall finish.
    - a. Prime drywall PRIOR to texturing.
  - 3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
  - 4. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
  - 1. Feather coats of joint compound so that camber is maximum 1/32 inch.
  - 2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile.

**3.06 TEXTURE FINISH**

- A. Apply finish texture coating by means of spraying apparatus in accordance with manufacturer's instructions and to match approved sample.

**3.07 TOLERANCES**

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

**END OF SECTION**

**SECTION 09 7730  
SANITARY WALL PANELS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Waterproof, sanitary panels, adhesive-applied to gypsum board walls.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 9005 - Joint Sealers: Sealant used in conjunction with sanitary wall panels.
- B. Section 09 2116 - Gypsum Board Assemblies: Gypsum board to receive sanitary wall covering.

**1.03 REFERENCE STANDARDS**

- A. ASTM D570 - Standard Test Method for Water Absorption of Plastics; '98 (2005).
- B. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics; '02a.
- C. ASTM D732 - Standard Test Method for Shear Strength of Plastics by Punch Tool; '02.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; '08a.
- E. ASTM F736 - Standard Test Method for Impact Resistance of Monolithic Polycarbonate Sheet by Means of a Falling Weight; '01.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - "Submittals", for submittal procedures.
- B. Product Data: Provide data for wall covering and accessories showing compliance with specified requirements.
- C. Shop Drawings: Indicate wall sheet layout, dimensions, moldings and installation details.
- D. Samples:
  - 1. Wall covering in selected type, finish and color: 5 x 7-inches minimum size.
  - 2. Two (2) inches minimum length of moldings.
- E. Manufacturer's installation and maintenance instructions.
- F.

**1.05 QUALITY ASSURANCE**

- A. Sanitary wall covering shall comply with:
  - 1. United States Department of Agriculture (USDA) requirements for food preparation facilities, incidental contact.
  - 2. Food and Drug Administration (FDA) 1999 Food Code 6-101.11.
  - 3. State of California Proposition 65, "Safe Drinking Water and Toxic Enforcement Act of 1986".

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. During delivery and storage keep sanitary wall sheets flat on a smooth, dry surface. Avoid extreme temperature changes.

**1.07 FIELD CONDITIONS**

- A. Do not install sanitary wall panels until building is enclosed, painting is complete and temperature and humidity are similar to conditions of completed, occupied building.
- B. Prior to installation, store materials for 24 hours minimum, in area of installation to achieve temperature stability.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Parkland Plastics, Inc. PO Box 339, 104 Yoder Drive, Middlebury, Indiana 46540. Phone: 800-835-4110.
- B. Substitutions and Product Options: Under provisions of Section 01 60 00 - "Product Requirements".

**2.02 MATERIALS**

- A. PLAS-TEX NRP: Extruded Plas-Tex sheet.
  - 1. Type: Waterproof, mineral reinforced sanitary wall panels with embossed matte surface.
  - 2. Material: Polyethylene and polypropylene resins mixed with calcium carbonate and extruded to form chemically inert, mineral reinforced sheet. Sheets with fiberglass reinforcements are not acceptable.
  - 3. Color: Selected by Architect from manufacturer's full range of colors. Color shall be consistent for full thickness.
  - 4. Sheet Size: 48-inches wide x 96-inches high.
  - 5. Sheet Thickness: 1/8-inch.
  - 6. Performance Characteristics:
    - a. Resistant to fungi and bacteria growth, cleaning agents, acids and other chemicals.
    - b. No yellowing or color change with corrosive environments.
  - 7. Fire rating tested in accordance with ASTM E84: Class C.
    - a. Flame Spread: 105 maximum.
    - b. Smoke Developed: 435 maximum.
  - 8. Physical Properties:
    - a. Water absorption tested in accordance with ASTM D570: 0.055 percent maximum.
    - b. Shear Strength tested in accordance with ASTM D732: 2970 psi, minimum.
    - c. Compressive Strength tested in accordance with ASTM D695: 5293 psi, minimum.
    - d. Impact Resistance tested in accordance with ASTM F736.
- B. PLAS-TEX PolyWall: Extruded Plas-Tex sheet.
  - 1. Type: Waterproof, mineral reinforced sanitary wall panels with embossed matte surface similar in appearance to vinyl wall covering, as manufactured by Parkland Plastics, Inc.
  - 2. Material: Polyethylene and polypropylene resins mixed with calcium carbonate and extruded to form chemically inert, mineral reinforced sheet. Sheets with fiberglass reinforcements are not acceptable.
  - 3. Color: Selected by Architect from manufacturer's full range of colors. Color shall be consistent for full thickness.
  - 4. Sheet Size: 48-inches wide x 96-inches high.
  - 5. Sheet Thickness: 3/32-inch.
  - 6. Performance Characteristics:
    - a. Resistant to fungi and bacteria growth, cleaning agents, acids and other chemicals.
    - b. No yellowing or color change with corrosive environments.
  - 7. Fire rating tested in accordance with ASTM E84: Class C.
    - a. Flame Spread: 105 maximum.
    - b. Smoke Developed: 435 maximum.
  - 8. Physical Properties:
    - a. Water absorption tested in accordance with ASTM D570: 0.055 percent maximum.
    - b. Shear Strength tested in accordance with ASTM D732: 2970 psi, minimum.
    - c. Compressive Strength tested in accordance with ASTM D695: 5293 psi, minimum.
    - d. Impact Resistance tested in accordance with ASTM F736.

**2.03 ACCESSORIES**

- A. Adhesive: Trowel grade, non-flammable or latex adhesive as recommended by sanitary wall panel manufacturer. Do not use solvent based or tube style adhesives.

- B. Moldings: Extruded polyvinyl chloride (PVC) channel type moldings with flanges to fit beneath wall sheets.
  - 1. Types: Shapes for panel division, inside and outside corners, and edge caps.
  - 2. Color: Match sanitary wall covering color.
- C. Sealant: Silicone type as specified in Section 07 9005 - "Joint Sealers" and approved by sanitary wall panel manufacturer for this application.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that substrates to receive sanitary wall panels are flat, clean, dry, solid and free from coatings and defects detrimental to installation.
- B. Verify that plumbing, mechanical and electrical services within walls have been installed, tested and approved.

#### **3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions and approved Shop Drawings.
- B. Install sheets vertically with adhesive.
- C. Cutting: Cut sheets by scoring and snapping with sheet metal shears, or sawing with fine toothed blade.
- D. Penetrations and Openings: Drill round openings. For rectangular cutouts, first drill hole at each corner to relieve stress. Prior to installation, position panel in place and verify cutout location and size are accurate.
- E. Adhesive: Apply to panel with notched trowel at approximately 1 gallon per 64 square feet. Do not apply adhesive to wall.
- F. Position sheet against wall. Ensure sheets are not tightly fitted. Allow 1/4-inch gap at top and bottom of vertical sheet and 1/8-inch gap at vertical joints between panels and adjacent construction. Secure sheet by applying pressure with roller over entire surface. Ensure adhesive contact is even and complete.
- G. Moldings: Apply moldings in conjunction with panels.
  - 1. Provide moldings for wall panel joints, perimeter edges and corners. Neatly cut molding to required lengths. Ensure moldings are straight and correctly aligned.
  - 2. Allow 1/8-inch space in molding channels for wall panel expansion.
  - 3. Apply continuous bead of sealant in all molding channels.
- H. Immediately remove excess adhesive and sealant from wall panels and moldings. Adhesive and sealant should not be visible in completed system.

#### **3.03 PROTECTION**

- A. Protect installed sanitary wall panels from subsequent construction operations.

**END OF SECTION**

**SECTION 09 9000  
PAINTING AND COATING**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints and other coatings.
- C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
  - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
  - 2. Exposed surfaces of steel lintels and ledge angles.
  - 3. Mechanical and Electrical:
    - a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
    - b. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
    - c. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
- D. Do Not Paint or Finish the Following Items:
  - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
  - 2. Items indicated to receive other finishes.
  - 3. Items indicated to remain unfinished.
  - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
  - 5. Non-metallic roofing and flashing.
  - 6. Stainless steel, anodized aluminum, bronze, terne, and lead items.
  - 7. Marble, granite, slate, and other natural stones.
  - 8. Floors, unless specifically so indicated.
  - 9. Ceramic and other tiles.
  - 10. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
  - 11. Glass.
  - 12. Concrete masonry in utility, mechanical, and electrical spaces.
  - 13. Acoustical materials, unless specifically so indicated.
  - 14. Concealed pipes, ducts, and conduits.

**1.02 RELATED REQUIREMENTS**

- A. Section 09 2116 - Gypsum Board Assemblies
- B. Section 22 0553 - Identification for Plumbing Piping and Equipment: Painted identification.
- C. Section 23 0553 - Identification for HVAC Piping and Equipment: Painted identification.
- D. Section 26 0553 - Identification for Electrical Systems: Painted identification.

**1.03 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2014.
- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

- D. SCAQMD-1113 - South Coast Air Quality Management District Rule No. 1113, Current edition.

#### **1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of all products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
  - 2. Manufacturer's installation instructions.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
  - 1. Where sheen is specified, submit samples in only that sheen.
  - 2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens definitely not required.

#### **1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years experience.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

#### **1.07 FIELD CONDITIONS**

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Provide all paint and coating products from the same manufacturer to the greatest extent possible.
  - 1. In the event that a single manufacturer cannot provide all specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.
- B. Paints:
  - 1. Behr Process Corporation: [www.behr.com](http://www.behr.com).
  - 2. Glidden Professional: [www.gliddenprofessional.com](http://www.gliddenprofessional.com).
  - 3. Sherwin-Williams Company: [www.sherwin-williams.com](http://www.sherwin-williams.com).
  - 4. Vista Paint.
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: See Section 01 6000 - PRODUCT REQUIREMENTS.

**2.02 PAINTS AND COATINGS - GENERAL**

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
  - 1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  - 2. Supply each coating material in quantity required to complete entire project's work from a single production run.
  - 3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- B. Primers: As follows unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- C. Volatile Organic Compound (VOC) Content:
  - 1. Provide coatings that comply with the most stringent requirements specified in the following:
    - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
    - b. SCAQMD 1113 Rule.
    - c. Architectural coatings VOC limits of the State in which the Project is located.
  - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- D. Colors: To be selected from manufacturer's full range of available colors.
  - 1. Selection to be made by Architect after award of contract.
  - 2. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.
  - 3. In utility areas, finish equipment, piping, conduit, and exposed duct work in colors according to the to match wall and ceiling color.

**2.03 PAINT SYSTEMS - INTERIOR**

- A. Paint I-OP - All Interior Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry, brick, wood, plaster, uncoated steel, shop primed steel, galvanized steel, and aluminum.
  - 1. Two top coats and one coat primer.
  - 2. Eggshell: MPI gloss level 3; use this sheen at all locations.
  - 3. Top Coat Product(s):
    - a. Dunn-Edwards.
  - 4. Primer(s): As recommended by manufacturer of top coats.
- B. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals:
  - 1. Medium duty applications include Interior doors and door frames
  - 2. Two top coats and one coat primer.
  - 3. Primer(s): As recommended by manufacturer of top coats.
- C. Paint I-OP-DF - Dry Fall: Metals; exposed structure and overhead-mounted services in utilitarian spaces, including shop primed steel deck, structural steel, metal fabrications, galvanized ducts, galvanized conduit, and galvanized piping.
  - 1. Shop primer by others.
  - 2. One top coat; white.

**2.04 ACCESSORY MATERIALS**

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Do not begin application of coatings until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
  - 1. Gypsum Wallboard: 12 percent.
  - 2. Plaster and Stucco: 12 percent.
  - 3. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
  - 4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
  - 5. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair. Brush off walls and ceilings prior to texturing and painting.
- H. Plaster Surfaces to be Painted: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- I. Aluminum Surfaces to be Painted: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- J. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- K. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-SP 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).
- L. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.



- M. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
- N. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- O. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.
- P. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

### 3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.
- C. Apply products in accordance with manufacturer's instructions.
- D. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- E. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- F. Apply each coat to uniform appearance.
- G. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.
- H. Sand wood and metal surfaces lightly between coats to achieve required finish.
- I. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- J. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### 3.04 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

### 3.05 PROTECTION

- A. Touch-up damaged coatings after Substantial Completion.

### 3.06 SCHEDULE - EXTERIOR SURFACES

- A. Concrete, Concrete Block:
  - 1. One coat block primer. Vista Paint 018 100% Acrylic Block Filler.
  - 2. One coat primer sealer latex. Vista Paint 4600 Uniprime II.
  - 3. One coat latex paint. Vista Paint 3000 Acribond.
- B. Steel - Unprimed:
  - 1. One coat zinc chromate primer. Vista Paint 4800 Metal Pro or Carbomastic 90.
  - 2. Two coats acrylic enamel semi-gloss. Vista Paint 8400 Semi-Gloss or 7900 Premogloss or Carboline 133 VOC.
- C. Steel - Shop Primed:
  - 1. Touch-up with zinc chromate primer. Vista Paint 4800 Metal Pro or Carbozinc 90.
  - 2. Two coats alkyd enamel semi-gloss. Vista Paint 8400 Semi-Gloss or 7900 Premogloss or Carboline 133 VOC.
- D. Steel - Galvanized (where indicated):

1. Pretreatment: Jasco Prep N Prime.
  2. One coat zinc chromate primer. Vista Paint 4800 Metal Pro or Carbozinc 90.
  3. Two coats acrylic enamel, semi-gloss. Vista Paint 8400 Semi-Gloss or 7900 Premogloss or Carboline 133 VOC.
- E. Pavement Markings:
1. "Laycold Line Paint" or Vista Paint 6900 On-Line Traffic Marking Paint.

### **3.07 SCHEDULE - INTERIOR SURFACES**

- A. Concrete:
1. One coat block filler. Vista Paint 018 100% Acrylic Block Filler.
  2. One coat primer sealer latex. Vista Paint 4600 Uniprime II
  3. One coat latex, eggshell. Vista Paint 8300 Carefree Eggshell.
- B. Steel - Unprimed:
1. One coat zinc chromate primer. Vista Paint 4800 Metal Pro.
  2. Two coats semi-gloss. Vista Paint 8400 Carefree Semi-Gloss or Rust-Oleum Sierra S70 or S71 Primer and Rust-Oleum Sierra S22 Finish.
- C. Steel - Primed:
1. Touch-up with original primer. Vista Paint 4800 Metal Pro.
  2. Two coats semi-gloss. Vista Paint 8400 Carefree Semi-Gloss or Rust-Oleum Sierra S70 or S71 Primer and Rust-Oleum Sierra S22 Finish.
- D. Steel - Galvanized:
1. Pretreatment: Jasco Prep N Prime.
  2. One coat zinc chromate primer. Vista Paint 4800 Metal Pro.
  3. Two coats semi-gloss. Vista Paint 8400 Carefree Semi-Gloss or Rust-Oleum Sierra S70 or S71 Primer and Rust-Oleum Sierra S22 Finish.
- E. Plaster, Gypsum Board
1. One coat alkyd primer sealer. Vista Paint 1100 High Build PVA.
  2. Two coats alkyd enamel, eggshell. Vista Paint 8300 Carefree Eggshell.

**END OF SECTION**

**SECTION 10 0001**  
**MISCELLANEOUS SPECIALTIES**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Bathroom Signs.

**1.02 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. CBC - 2016 California Building Code, based on 2015 International Building Code (IBC), with California Amendments.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - "Submittals", for submittal procedures.
- B. Product Data: Provide product data, accessories, configurations and installation instructions..

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store and protect products under provisions of Section 01 60 00 - "Product Requirements".

**PART 2 PRODUCTS****2.01 MANUFACTURERS (OR APPROVED EQUAL)**

- A. Bathroom Signs:
  - 1. Door Mounted Signs (ASI Sign Systems or approved equal).
    - a. Public Restroom - Unisex: 12-inch diameter circle with 1/4" thick triangle superimposed within circle, white on blue plexiglass, screw mount.
      - 1) Per detail on plans
    - b. All signs to be ADA compliant, including required Braille (Grade 2).
    - c. Mount as indicated.
  - 2. Wall Mounted Signs (ASI Sign Systems or approved equal).
    - a. Character type to be raised 1/32-inch minimum and be sans serif uppercase characters accompanied by Grade 2 Braille (CBC 1117B.5).
      - 1) Finish to be non-glare.
      - 2) Characters on signs to have width-to-height ratio of between 3:5 and 1:1 and a stroke width-to-height ratio of between 1:5 and 1:10.
    - b. Public Restroom - Unisex: With the International symbol of accessibility. Border dimensions of pictogram to be 6" minimum. Verbal description ("Restroom") to be placed directly below the pictogram symbol of accessibility.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Beginning of installation means acceptance of existing conditions.

**3.02 ANCHORAGE**

- A. Furnish and install all anchorage devices required to install the item and its appurtenances, complete. Provide anchorage in ample time, when required to be built-in by other trades.

**3.03 INSTALLATION**

- A. Install all items not called for to be installed by manufacturer or supplier. Install per details on drawings, manufacturer's printed installation instructions and any additional requirements specified. All wall-mounted items shall be securely fastened to solid backing or blocking.

**3.04 ADJUSTING AND CLEANING**

- A. Adjust operating devices to ensure that equipment functions smoothly.

**SECTION 10 4400  
FIRE PROTECTION SPECIALTIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fire extinguishers.
- B. Accessories.

**1.02 REFERENCE STANDARDS**

- A. NFPA 10 - Standard for Portable Fire Extinguishers; 2013.
- B. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide extinguisher operational features.
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Fire Extinguishers:

**2.02 FIRE EXTINGUISHERS**

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gage.
  - 1. Class: A:B:C type.
  - 2. Temperature range: Minus 40 degrees F to \_\_\_ degrees F.
- C. Carbon Dioxide Type Fire Extinguishers: Aluminum tank, with pressure gage.
  - 1. Class: B:C type.
  - 2. Temperature range: Minus 40 degrees F to 120 degrees F.
- D. Dry Chemical Type Fire Extinguishers: Stainless steel tank, with pressure gage.
  - 1. Class: K type.
  - 2. Temperature range: Minus 20 degrees F to 120 degrees F.

**2.03 ACCESSORIES**

- A. Extinguisher Brackets: Formed steel, galvanized and enamel finished.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

**END OF SECTION**

**SECTION 10 4416  
FIRE EXTINGUISHERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fire extinguishers.
- B. Accessories.

**1.02 REFERENCE STANDARDS**

- A. NFPA 10 - Standard for Portable Fire Extinguishers; National Fire Protection Association; '07.
- B. UL (FPED) - Fire Protection Equipment Directory; Underwriters Laboratories Inc.; current edition.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - "Submittals", for submittal procedures.
- B. Product Data: Provide extinguisher operational features.
- C. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Fire Extinguishers (Interior): J.L. Industries Cosmic 5E, 5# capacity, UL rated for 2A:10BC type fires.
  - 1. Extinguisher Brackets: Formed steel, galvanized and enamel finished.
- B. Comply with requirements of NFPA 10 and applicable codes, whichever is more stringent.
- C. Provide extinguishers labeled by Underwriters Laboratories Inc. (UL) for the purpose specified and indicated.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinets are correctly sized and located.

**3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level in wall openings (interior), as indicated.
- C. Place extinguishers and accessories in cabinets.

**END OF SECTION**

**SECTION 13 3419  
METAL BUILDING SYSTEMS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Manufacturer-engineered, shop-fabricated structural steel building frame.
- B. Metal Roof Panels, Insulated Metal wall panels, gutters and down spouts.
- C. Exterior doors, windows, skylights, overhead doors, and louvers.

**1.02 RELATED REQUIREMENTS**

- A. Section 05 4000 - Cold Formed Metal Framing
- B. Section 07 9200 - Joint Sealants: Sealing joints between accessory components and wall system.
- C. Section 07 9005 - Joint Sealers.
- D. Section 08 1113 - Hollow Metal Doors and Frames.
- E. Section 08 3323 - Overhead Coiling Doors

**1.03 REFERENCE STANDARDS**

- A. AISC 360 - Specification for Structural Steel Buildings; 2010.
- B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014.
- E. ASTM A490 - Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength; 2014a.
- F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.
- G. ASTM A529/A529M - Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality; 2014.
- H. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010 (Reapproved 2015).
- I. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2014.
- J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- K. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- L. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.
- M. MBMA (MBSM) - Metal Building Systems Manual; Metal Building Manufacturers Association; 2012.
- N. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies; Current Edition, Including All Revisions.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week before starting work of this section.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on profiles, component dimensions, fasteners.

- C. Shop Drawings: Indicate assembly dimensions, locations of structural members, connections; wall and roof system dimensions, panel layout, general construction details, anchorages and method of anchorage, installation; framing anchor bolt settings, sizes, and locations from datum, foundation loads; indicate welded connections with AWS A2.4 welding symbols; indicate net weld lengths; provide professional seal and signature.

#### 1.06 QUALITY ASSURANCE

- A. Design structural components, develop shop drawings, and perform shop and site work under direct supervision of a Professional Structural Engineer experienced in design of this Work.
  - 1. Design Engineer Qualifications: Licensed in the State in which the Project is located.
- B. Perform work in accordance with AISC 360 and MBMA (MBSM).
- C. Perform welding in accordance with AWS D1.1/D1.1M.
- D. Manufacturer Qualifications: Company specializing in the manufacture of products similar to those required for this project.
  - 1. Not less than 5 years of documented experience
- E. Erector Qualifications: Company specializing in performing the work of this section with minimum 5 years experience.

#### 1.07 WARRANTY

- A. See Section 01 7700 - Closeout Submittals, for additional warranty requirements
- B. All Components: Manufacturer's standard one (1) year workmanship warranty.
- C. Roof Panels: Manufacturer's standard twenty-five (25) year paint color-finish Warranty and manufacturer's standard twenty (20) year Zincalume no Perforation warranty.

### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Metal Buildings:
  - 1. American Buildings Co, a Nucor Company: [www.americanbuildings.com](http://www.americanbuildings.com)
  - 2. Nucor Building Systems; -: [www.nucorbuildingsystems.com](http://www.nucorbuildingsystems.com).
  - 3. Substitutions: See Section 01 6000 - PRODUCT REQUIREMENTS.

#### 2.02 METAL BUILDING

- A. Single span rigid frame, with Lean-to.
- B. Bay Spacing: 25 ft / 16'-4"; verify with plans.
- C. Primary Framing: Rigid frame of rafter beams and columns, intermediate columns, and wind bracing.
- D. Secondary Framing: Purlins, and other items detailed.
- E. Wall System: Preformed metal panels of horizontal profile, with sub-girt framing/anchorage assembly, and accessory components.
- F. Roof System: Standing seam metal roof oriented parallel to slope, with sub-girt framing/anchorage assembly, insulation, and accessory components.
- G. Roof Slope: 4 inches in 12 inches.

#### 2.03 MATERIALS - FRAMING

- A. Structural Steel Members: ASTM A36/A36M.
- B. Anchor Bolts: ASTM A307, galvanized to ASTM A153/A153M.
- C. Welding Materials: Type required for materials being welded.
- D. Grout: ASTM C1107/C1107M; Non-shrink; premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
  - 1. Minimum Compressive Strength at 48 Hours: 2,000 pounds per square inch.
  - 2. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch.

**2.04 MATERIALS - WALLS AND ROOF**

- A. Steel Sheet: ASTM A792/A792M aluminum-zinc alloy coated to AZ50/AZM150.
- B. Insulation: Batt glass fiber type, faced with reinforced white vinyl, ASTM E84, Class A, flame spread index of 25 or less where exposed, friction fit, 8 inches thick.
  - 1. Rigid foam thermal blocks
- C. Joint Seal Gaskets: Manufacturer's standard type.
- D. Fasteners: Manufacturer's standard type, galvanized to comply with requirements of ASTM A153/A153M, finish to match adjacent surfaces when exterior exposed.
- E. Sealant: Manufacturer's standard type.
- F. Trim, Closure Pieces, Caps, Flashings, Gutters, Downspouts, Rain Water Diverter, Fascias, and Infills: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
- G. Standing Seam Metal Roof system with Kynar finish, by metal building manufacturer.
  - 1. Standing Seam II (SP2) Roof Panel
    - a. 24 gauge
  - 2. Color selected by Architect from standard range.
- H. Wall Panel
  - 1. Insulated Wall Panel HE40
  - 2. Exterior Gauge: 26
  - 3. Interior Gauge: 26
  - 4. Color: selected from standard

**2.05 ACCESSORY COMPONENTS**

- A. Doors and Frames: Specified in Section 08 1113.
- B. Overhead Doors: Specified in Section 08 3613.
- C. Windows: Manufacturer's standard.
  - 1. Fully flashed, self-framing
- D. Unit Skylight: Manufacturer's standard.
  - 1. Fiberglass reinforced with high quality thermo-setting polyester resin and U. V. inhibitors
  - 2. Intergrated Prismatic Skylight
    - a. Double glazed polycarbonate lens
  - 3. Nominal Size: 4'-0" by 4'-0" inches single unit.
- E. Wall Louvers: Specified in Section 08 9100

**2.06 DESIGN CRITERIA**

- A. Installed Thermal Resistance of Wall System: R-value of 19.
- B. Installed Thermal Resistance of Roof System: R-value of 30.
- C. Design members to withstand dead load, applicable snow load, and design loads due to pressure and suction of wind calculated in accordance with applicable code.
- D. Design members to withstand 20 psf live load, 30 psf nominal snow load, and 115 psf positive and negative wind loads.
- E. Design members to withstand UL 580 Uplift Class 60.
- F. Exterior wall and roof system shall withstand imposed loads with maximum allowable deflection of 1/90 of span.
- G. Provide drainage to exterior for water entering or condensation occurring within wall or roof system.
- H. Permit movement of components without buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to temperature range of 90 degrees F.



- I. Size and fabricate wall and roof systems free of distortion or defects detrimental to appearance or performance.

#### **2.07 FABRICATION - FRAMING**

- A. Fabricate members in accordance with AISC 360 for plate, bar, tube, or rolled structural shapes.
- B. Provide framing for skylight openings.

#### **2.08 FABRICATION - WALL AND ROOF PANELS**

1. Siding: Minimum .01875 inch metal thickness, flat profile, lapped edges fitted with continuous gaskets.
2. Roofing: standing seam metal roof
  - a. 24 ga.
3. Soffit Panels: Minimum .025 inch metal thickness, V crimped profile indicated, unperforated.
4. Girts/Purlins: Rolled formed structural shape to receive siding, roofing and liner sheet.
5. Internal and External Corners: Same material thickness and finish as adjacent material, profile brake formed to required angles. Back brace mitered internal corners with per manuf. req. inch thick sheet.
6. Flashings, Closure Pieces, Fascia: Same material and finish as adjacent material, profile to suit system.
7. Fasteners: To maintain load requirements and weather tight installation, same finish as cladding, non-corrosive type.

#### **2.09 FABRICATION - GUTTERS AND DOWNSPOUTS**

- A. Form gutters and downspouts of 4" profile and size indicated to collect and remove water. Fabricate with connection pieces.
- B. Form sections in maximum possible lengths. Hem exposed edges. Allow for expansion at joints.
- C. Fabricate support straps of same material and finish as roofing metal, color as selected.

#### **2.10 FINISHES**

- A. Framing Members: Clean, prepare, and shop prime. Do not prime surfaces to be field welded.
- B. Exterior Surfaces of Wall Components and Accessories: Precoated enamel on steel of modified silicone finish, standard color as selected from manufacturer's standard range.
- C. Interior Surfaces of Roof Components and Accessories: Precoated enamel on steel of modified silicone finish, standard color.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that foundation, floor slab, mechanical and electrical utilities, and placed anchors are in correct position

#### **3.02 ERECTION - FRAMING**

- A. Erect framing in accordance with AISC 360.
- B. Provide for erection and wind loads. Provide temporary bracing to maintain structure plumb and in alignment until completion of erection and installation of permanent bracing. Locate braced bays as indicated.
- C. Set column base plates with non-shrink grout to achieve full plate bearing.
- D. Do not field cut or alter structural members without approval.
- E. After erection, prime welds, abrasions, and surfaces not shop primed.

#### **3.03 ERECTION - WALL AND ROOF PANELS**

- A. Install in accordance with manufacturer's instructions.

- B. Exercise care when cutting prefinished material to ensure cuttings do not remain on finish surface.
- C. Fasten cladding system to structural supports, aligned level and plumb.
- D. Locate end laps over supports. End laps minimum 2 inches. Place side laps over bearing.
- E. Provide expansion joints where indicated.
- F. Use concealed fasteners.
- G. Install sealant and gaskets, providing weather tight installation.

#### **3.04 ERECTION - GUTTERS AND DOWNSPOUTS**

- A. Rigidly support and secure components. Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts.
- B. Slope gutters minimum 1/8 inch/ft.
- C. Install splash pads under each downspout.

#### **3.05 ERECTION - SKYLIGHTS**

- A. Install in accordance with manufacturer's instructions.
- B. Coordinate with installation of roofing system and related flashings.
- C. Seal between skylight units and roof system, providing weather tight installation.

#### **3.06 INSTALLATION - ACCESSORY COMPONENTS IN WALL SYSTEM**

- A. Install door frames, doors, overhead doors, and windows and glass in accordance with manufacturer's instructions.
- B. Seal wall and roof accessories watertight and weather tight with sealant in accordance with Section 07 9005.

#### **3.07 TOLERANCES**

- A. Framing Members: 1/4 inch from level; 1/8 inch from plumb.
- B. Siding and Roofing: 1/8 inch from true position.

**END OF SECTION**

**SECTION 22 0517**  
**SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING**

**PART 1 GENERAL****1.01 SUMMARY**

- A. Section Includes:
  - 1. Sleeves.
  - 2. Sleeve-seal systems.

**1.02 SUBMITTALS**

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

**PART 2 PRODUCTS****2.01 SLEEVES**

- A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.
- C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.
- D. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.
- E. Galvanized-Steel-Sheet Sleeves: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

**2.02 SLEEVE-SEAL SYSTEMS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Advance Products & Systems, Inc.
  - 2. CALPICO, Inc.
  - 3. Metraflex Company (The).
  - 4. Pipeline Seal and Insulator, Inc.
  - 5. Proco Products, Inc.
- B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
  - 1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
  - 2. Pressure Plates: Carbon steel.
  - 3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

**PART 3 EXECUTION****3.01 SLEEVE INSTALLATION**

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
  - 1. Sleeves are not required for core-drilled holes.
- C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
  - 1. Cut sleeves to length for mounting flush with both surfaces.
    - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
  - 2. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

- D. Install sleeves for pipes passing through interior partitions.
  - 1. Cut sleeves to length for mounting flush with both surfaces.
  - 2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
  - 3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Division 07 Section "Joint Sealers."

### **3.02 SLEEVE-SEAL-SYSTEM INSTALLATION**

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

### **3.03 SLEEVE AND SLEEVE-SEAL SCHEDULE**

- A. Use sleeves and sleeve seals for the following piping-penetration applications:
  - 1. Exterior Concrete Walls above Grade:
    - a. Piping Smaller Than NPS 6: Galvanized-steel wall sleeves.
  - 2. Exterior Concrete Walls below Grade:
    - a. Piping Smaller Than NPS 6: Galvanized-steel wall sleeves with sleeve-seal system.
      - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
  - 3. Concrete Slabs-on-Grade:
    - a. Piping Smaller Than NPS 6: Galvanized-steel wall sleeves with sleeve-seal system.
      - 1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
  - 4. Concrete Slabs above Grade:
    - a. Piping Smaller Than NPS 6: PVC-pipe sleeves.
  - 5. Interior Partitions:
    - a. Piping Smaller Than NPS 6: PVC-pipe sleeves.

**END OF SECTION**

**SECTION 22 0518**  
**ESCUTCHEONS FOR PLUMBING PIPING**

**PART 1 GENERAL****1.01 SUMMARY**

- A. Section Includes:
  - 1. Escutcheons.
  - 2. Floor plates.

**1.02 SUBMITTALS**

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

**PART 2 PRODUCTS****2.01 ESCUTCHEONS**

- A. One-Piece, Cast-Brass Type: With polished, chrome-plated finish and setscrew fastener.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.
- C. One-Piece, Stamped-Steel Type: With chrome-plated finish and spring-clip fasteners.

**2.02 FLOOR PLATES**

- A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

**PART 3 EXECUTION****3.01 INSTALLATION**

- A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.
- B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
  - 1. Escutcheons for New Piping:
    - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
    - b. Chrome-Plated Piping: One-piece, cast-brass type with polished, chrome-plated finish.
    - c. Insulated Piping: One-piece, stamped-steel type.
    - d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
    - e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
    - f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
    - g. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type.
    - h. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with rough-brass finish.
    - i. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type.
    - j. Bare Piping in Equipment Rooms: One-piece, cast-brass type with rough-brass finish.
    - k. Bare Piping in Equipment Rooms: One-piece, stamped-steel type.
- C. Install floor plates for piping penetrations of equipment-room floors.
- D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.
  - 1. New Piping: One-piece, floor-plate type.

**3.02 FIELD QUALITY CONTROL**

- A. Replace broken and damaged escutcheons and floor plates using new materials.

**SECTION 22 0523**  
**GENERAL-DUTY VALVES FOR PLUMBING PIPING**

**PART 1 GENERAL****1.01 SUMMARY**

- A. Section Includes:
  - 1. Brass ball valves.
  - 2. Bronze ball valves.
  - 3. Bronze swing check valves.
  - 4. Bronze gate valves.
  - 5. Iron gate valves.
  - 6. Bronze globe valves.
- B. Related Sections:
  - 1. Division 22 plumbing piping Sections for specialty valves applicable to those Sections only.
  - 2. Division 22 Section "Identification for Plumbing Piping and Equipment" for valve tags and schedules.
  - 3. Division 33 water distribution piping Sections for general-duty and specialty valves for site construction piping.

**1.02 SUBMITTALS**

- A. Product Data: For each type of valve indicated.

**1.03 QUALITY ASSURANCE**

- A. ASME Compliance: ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
- B. NSF Compliance: NSF 61 for valve materials for potable-water service.

**PART 2 PRODUCTS****2.01 GENERAL REQUIREMENTS FOR VALVES**

- A. Refer to valve schedule articles for applications of valves.
- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valves in Insulated Piping: With 2-inch stem extensions and the following features:
  - 1. Gate Valves: With rising stem.
  - 2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
  - 3. Butterfly Valves: With extended neck.
- E. Valve-End Connections:
  - 1. Flanged: With flanges according to ASME B16.1 for iron valves.
  - 2. Solder Joint: With sockets according to ASME B16.18.
  - 3. Threaded: With threads according to ASME B1.20.1.

**2.02 BRASS BALL VALVES**

- A. Two-Piece, Full-Port, Brass Ball Valves with Brass Trim:
  - 1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include:
    - a. Kitz Corporation.
    - b. Milwaukee Valve Company.
    - c. NIBCO INC.
  - 2. Description:

- a. Standard: MSS SP-110.
- b. SWP Rating: 150 psig.
- c. CWP Rating: 600 psig.
- d. Body Design: Two piece.
- e. Body Material: Forged brass.
- f. Ends: Threaded.
- g. Seats: PTFE or TFE.
- h. Stem: Brass.
- i. Ball: Chrome-plated brass.
- j. Port: Full.

### 2.03 BRONZE BALL VALVES

- A. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:
  - 1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include:
    - a. Conbraco Industries, Inc.; Apollo Valves.
    - b. Milwaukee Valve Company.
    - c. NIBCO INC.
    - d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - 2. Description:
    - a. Standard: MSS SP-110.
    - b. SWP Rating: 150 psig.
    - c. CWP Rating: 600 psig.
    - d. Body Design: Two piece.
    - e. Body Material: Bronze.
    - f. Ends: Threaded.
    - g. Seats: PTFE or TFE.
    - h. Stem: Bronze.
    - i. Ball: Chrome-plated brass.
    - j. Port: Full.

### 2.04 BRONZE SWING CHECK VALVES

- A. Class 125, Bronze Swing Check Valves with Bronze Disc:
  - 1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include:
    - a. Kitz Corporation.
    - b. Milwaukee Valve Company.
    - c. NIBCO INC.
    - d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - 2. Description:
    - a. Standard: MSS SP-80, Type 3.
    - b. CWP Rating: 200 psig.
    - c. Body Design: Horizontal flow.
    - d. Body Material: ASTM B 62, bronze.
    - e. Ends: Threaded.
    - f. Disc: Bronze.
- B. Class 125, Bronze Swing Check Valves with Nonmetallic Disc:
  - 1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include:
    - a. Kitz Corporation.
    - b. Milwaukee Valve Company.
    - c. NIBCO INC.
    - d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - 2. Description:

- a. Standard: MSS SP-80, Type 4.
- b. CWP Rating: 200 psig.
- c. Body Design: Horizontal flow.
- d. Body Material: ASTM B 62, bronze.
- e. Ends: Threaded.
- f. Disc: PTFE or TFE.

## 2.05 BRONZE GATE VALVES

- A. Class 125, NRS Bronze Gate Valves:
  1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include:
    - a. Kitz Corporation.
    - b. Milwaukee Valve Company.
    - c. NIBCO INC.
    - d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  2. Description:
    - a. Standard: MSS SP-80, Type 1.
    - b. CWP Rating: 200 psig.
    - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
    - d. Ends: Threaded or solder joint.
    - e. Stem: Bronze.
    - f. Disc: Solid wedge; bronze.
    - g. Packing: Asbestos free.
    - h. Handwheel: Malleable iron or bronze.
- B. Class 125, RS Bronze Gate Valves:
  1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include:
    - a. Kitz Corporation.
    - b. Milwaukee Valve Company.
    - c. NIBCO INC.
    - d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  2. Description:
    - a. Standard: MSS SP-80, Type 2.
    - b. CWP Rating: 200 psig.
    - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
    - d. Ends: Threaded or solder joint.
    - e. Stem: Bronze.
    - f. Disc: Solid wedge; bronze.
    - g. Packing: Asbestos free.
    - h. Handwheel: Malleable iron or bronze.

## 2.06 BRONZE GLOBE VALVES

- A. Class 125, Bronze Globe Valves with Bronze Disc:
  1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include:
    - a. Kitz Corporation.
    - b. Milwaukee Valve Company.
    - c. NIBCO INC.
    - d. Red-White Valve Corporation.
    - e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  2. Description:
    - a. Standard: MSS SP-80, Type 1.
    - b. CWP Rating: 200 psig.
    - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.



- d. Ends: Threaded or solder joint.
  - e. Stem and Disc: Bronze.
  - f. Packing: Asbestos free.
  - g. Handwheel: Malleable iron or bronze.
- B. Class 125, Bronze Globe Valves with Nonmetallic Disc:
- 1. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include:
    - a. Crane Co.; Crane Valve Group; Crane Valves.
    - b. Crane Co.; Crane Valve Group; Stockham Division.
    - c. NIBCO INC.
  - 2. Description:
    - a. Standard: MSS SP-80, Type 2.
    - b. CWP Rating: 200 psig.
    - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
    - d. Ends: Threaded or solder joint.
    - e. Stem: Bronze.
    - f. Disc: PTFE or TFE.
    - g. Packing: Asbestos free.
    - h. Handwheel: Malleable iron or bronze.

### **PART 3 EXECUTION**

#### **3.01 VALVE INSTALLATION**

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.

#### **3.02 ADJUSTING**

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

#### **3.03 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS**

- A. If valve applications are not indicated, use the following:
  - 1. Shutoff Service: Ball or gate valves.
  - 2. Throttling Service: Globe or ball valves.
  - 3. Pump-Discharge Check Valves:
    - a. NPS 2 and Smaller: Bronze swing check valves with bronze disc.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
  - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
  - 2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
  - 3. For Steel Piping, NPS 2 and Smaller: Threaded ends.
  - 4. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends except where threaded valve-end option is indicated in valve schedules below.

#### **3.04 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE**

- A. Pipe NPS 2 and Smaller:
  - 1. Bronze and Brass Valves: May be provided with solder-joint ends instead of threaded ends.
  - 2. Bronze Angle Valves: Class 125, bronze disc.

3. Ball Valves: Two piece, full port, brass brass trim.
4. Bronze Swing Check Valves: Class 125, bronze disc.
5. Bronze Gate Valves: Class 125, NRS.
6. Bronze Globe Valves: Class 125, bronze disc.

**END OF SECTION**

**SECTION 22 0553**  
**IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT**

**PART 1 GENERAL****1.01 SUMMARY**

- A. Section Includes:
1. Equipment labels.
  2. Pipe labels.

**1.02 SUBMITTAL**

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

**PART 2 PRODUCTS****2.01 EQUIPMENT LABELS**

- A. Metal Labels for Equipment:
1. Material and Thickness: Brass, 0.040-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
  2. Minimum Label Size: Length and width vary for required label content, but not less than 2 by 3/4 inch.
  3. Minimum Letter Size: 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.
  4. Fasteners: Stainless-steel rivets or self-tapping screws.
  5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Plastic Labels for Equipment:
1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
  2. Letter Color: Black.
  3. Background Color: White
  4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
  5. Minimum Label Size: Length and width vary for required label content, but not less than 2 by 3/4 inch.
  6. Minimum Letter Size: 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.
  7. Fasteners: Stainless-steel rivets or self-tapping screws.
  8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.
- D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

**2.02 PIPE LABELS**

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
  - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
  - 2. Lettering Size: At least 1-1/2 inches high.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and in compatible primers, paints, and encapsulants.

#### **3.02 EQUIPMENT LABEL INSTALLATION**

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

#### **3.03 PIPE LABEL INSTALLATION**

- A. Piping Color-Coding: Painting of piping is specified in Division 09 Section "Painting and Coating."
- B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed 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 inaccessible 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 labels.
- C. Pipe Label Color Schedule:
  - 1. Base color coding and size of letters and arrows shall conform to ANSI A 13.1, "Scheme for the Identification of Piping Systems."

**END OF SECTION**

**SECTION 22 0719**  
**PLUMBING PIPING INSULATION**

**PART 1 GENERAL****1.01 SUMMARY**

- A. Section includes insulating the following plumbing piping services:
  - 1. Domestic hot-water piping.
  - 2. Domestic recirculating hot-water piping.
  - 3. Condensate drain piping.
  - 4. Supplies and drains for handicap-accessible lavatories and sinks.

**1.02 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
  - 2. Detail attachment and covering of heat tracing inside insulation.
  - 3. Detail insulation application at pipe expansion joints for each type of insulation.
  - 4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
  - 5. Detail removable insulation at piping specialties, equipment connections, and access panels.
  - 6. Detail application of field-applied jackets.
  - 7. Detail application at linkages of control devices.
- C. Field quality-control reports.

**1.03 QUALITY ASSURANCE**

- A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
  - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
  - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.
- B. Comply with the following applicable standards and other requirements specified for miscellaneous components:
  - 1. Supply and Drain Protective Shielding Guards: ICC A117.1.

**PART 2 PRODUCTS****2.01 INSULATION MATERIALS**

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

- F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Aeroflex USA, Inc.; Aerocel.
    - b. Armacell LLC; AP Armaflex.
    - c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.

## 2.02 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Aeroflex USA, Inc.; Aero seal.
    - b. Armacell LLC; Armaflex 520 Adhesive.
    - c. Foster Brand, Specialty Const ruction Brands, Inc., a busin ess of H. B. Fuller Company; 85-75.
    - d. K-Flex USA; R-373 Contact Adhesive.
  2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  3. Use adhesive that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.
- C. PVC Jacket Adhesive: Compatible with PVC jacket.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Dow Corning Corporation; 739, Dow Silicone.
    - b. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
    - c. P.I.C. Plastics, Inc.; Welding Adhesive.
    - d. Speedline Corporation; Polyco VP Adhesive.
  2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  3. Use adhesive that complies with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

## 2.03 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Foster Brand, Specialty Const ruction Brands, Inc., a busin ess of H. B. Fuller Company; 30-80/30-90.
    - b. Vimasco Corporation; 749.
  2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
  3. Service Temperature Range: Minus 20 to plus 180 deg F.
  4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
  5. Color: White.
- C. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-10.
  - b. Eagle Bridges - Marathon Industries; 550.
  - c. Foster Brand, Specialty Const ruction Brands, Inc., a busin ess of H. B. Fuller Company; 46-50.
  - d. Mon-Eco Industries, Inc.; 55-50.
  - e. Vimasco Corporation; WC-1/WC-5.
2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: 60 percent by volume and 66 percent by weight.
5. Color: White.

#### 2.04 SEALANTS

- A. Joint Sealants:
  1. Materials shall be compatible with insulation materials, jackets, and substrates.
  2. Permanently flexible, elastomeric sealant.
  3. Service Temperature Range: Minus 100 to plus 300 deg F.
  4. Color: White or gray.
  5. For indoor applications, use sealants that have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  6. Use sealants that comply with the test ing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers," including 2004 Addenda.

#### 2.05 FACTORY-APPLIED JACKETS

- A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
  1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
  2. ASJ-SSL: ASJ with self-sealing, p ressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
  3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

#### 2.06 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. PVC Jacket: High -impact-resistant, UV-resistant PVC com plying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and formin g. Thickness is indicated in field-applied jacket schedules.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Johns Manville; Zeston.
    - b. P.I.C. Plastics, Inc.; FG Series.
    - c. Proto Corporation; LoSmoke.
    - d. Speedline Corporation; SmokeSafe.
  2. Adhesive: As recommended by jacket material manufacturer.
  3. Color: White.
  4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
    - a. Shapes: 45- and 90 -degree, short- and long-radius elbows, tees, valves, flange s, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
- C. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
  1. Products: Subject to compliance with requirements, provide one of the following:

- a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Metal Jacketing Systems.
- b. ITW Insulation Systems; Aluminum and Stainless Steel Jacketing.
- c. RPR Products, Inc.; Insul-Mate.
2. Sheet and roll stock ready for shop or field sizing.
3. Finish and thickness are indicated in field-applied jacket schedules.
4. Moisture Barrier for Indoor Applications: 1-mil-thick, heat-bonded polyethylene and kraft paper.
5. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
6. Factory-Fabricated Fitting Covers:
  - a. Same material, finish, and thickness as jacket.
  - b. Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
  - c. Tee covers.
  - d. Flange and union covers.
  - e. End caps.
  - f. Beveled collars.
  - g. Valve covers.
  - h. Field fabricate fitting covers only if factory-fabricated fitting covers are not available.
- D. Underground Direct-Buried Jacket: 125-mil-thick vapor barrier and waterproofing membrane consisting of a rubberized bituminous resin reinforced with a woven-glass fiber or polyester scrim and laminated aluminum foil.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Pittsburgh Corning Corporation; Pittwrap.
    - b. Polyguard Products, Inc.; Insulrap No Torch 125.

## 2.07 PROTECTIVE SHIELDING GUARDS

- A. Protective Shielding Pipe Covers:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Plumberex.
    - b. McGuire Manufacturing.
    - c. Truebro; a brand of IPS Corporation.
    - d. Zurn Industries, LLC; Tubular Brass Plumbing Products Operation.
  2. Description: Manufactured plastic wraps for covering plumbing fixture hot-water supply and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.
- B. Protective Shielding Piping Enclosures,
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Truebro; a brand of IPS Corporation.
    - b. Zurn Industries, LLC; Tubular Brass Plumbing Products Operation.
  2. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA requirements.

## PART 3 EXECUTION

### 3.01 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.



**3.02 GENERAL INSTALLATION REQUIREMENTS**

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
  - 1. Install insulation continuously through hangers and around anchor attachments.
  - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
  - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
  - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
  - 1. Draw jacket tight and smooth.
  - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
  - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
    - a. For below-ambient services, apply vapor-barrier mastic over staples.
  - 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
  - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above-ambient services, do not install insulation to the following:
  - 1. Vibration-control devices.

2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Cleanouts.

### 3.03 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
  1. Seal penetrations with flashing sealant.
  2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
  4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.
- C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
  1. Seal penetrations with flashing sealant.
  2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
  4. Seal jacket to wall flashing with flashing sealant.
- D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

### 3.04 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
  1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
  2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
  3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
  4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
  5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter,

- whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
  7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
  8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
  9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
  2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
  3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
  4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
  5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.
- E. Buried Piping: Provide factory fabricated assembly with inner all-purpose service jacket with self-sealing lap, and asphalt impregnated open mesh glass fabric, with one mil (0.025 mm) thick aluminum foil sandwiched between three layers of bituminous compound; outer surface faced with a polyester film.

### 3.05 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
1. Install pipe insulation to outer diameter of pipe flange.
  2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.

3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
  4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
1. Install mitered sections of pipe insulation.
  2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Insulation Installation on Valves and Pipe Specialties:
1. Install preformed valve covers manufactured of same material as pipe insulation when available.
  2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
  3. Install insulation to flanges as specified for flange insulation application.
  4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

### 3.06 FIELD-APPLIED JACKET INSTALLATION

- A. Where FSK jackets are indicated, install as follows:
1. Draw jacket material smooth and tight.
  2. Install lap or joint strips with same material as jacket.
  3. Secure jacket to insulation with manufacturer's recommended adhesive.
  4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch-wide joint strips at end joints.
  5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.
- B. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.
1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- C. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

### 3.07 FINISHES

- A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 09 painting Sections.
1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
    - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

### 3.08 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:

1. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

### **3.09 PIPING INSULATION SCHEDULE, GENERAL**

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
1. Drainage piping located in crawl spaces.
  2. Underground piping.
  3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

### **3.10 INDOOR PIPING INSULATION SCHEDULE**

- A. Domestic Hot and Recirculated Hot Water: Insulation shall be the following:
1. Flexible Elastomeric: 3/4 inch thick.
- B. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities: Insulation shall be the following:
1. Flexible Elastomeric: 1/2 inch thick.
- C. Sanitary Waste Piping Where Heat Tracing Is Installed: Mineral-fiber, preformed pipe insulation, Type I, 1-1/2 inches thick.

### **3.11 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE**

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Concealed:
1. None.
  2. PVC: 20 mils thick.
  3. Aluminum, Corrugated: 0.016 inch thick.
- D. Piping, Exposed:
1. PVC: 20 mils thick.
  2. Painted Aluminum, Corrugated: 0.016 inch thick.

### **3.12 UNDERGROUND, FIELD-INSTALLED INSULATION JACKET**

- A. For underground direct-buried piping applications, install underground direct-buried jacket over insulation material.

**END OF SECTION**

**SECTION 22 1116**  
**DOMESTIC WATER PIPING**

**PART 1 GENERAL****1.01 SUMMARY**

- A. Section Includes:
  - 1. Under-building slab and aboveground domestic water pipes, tubes, fittings, and specialties inside the building.
  - 2. Specialty valves.
  - 3. Flexible connectors.
  - 4. Water meters furnished by utility company for installation by Contractor.

**1.02 PERFORMANCE REQUIREMENTS**

- A. Seismic Performance: Domestic water piping and support and installation shall withstand effects of earthquake motions determined according to ASCE/SEI 7.

**1.03 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Field quality-control reports.

**1.04 QUALITY ASSURANCE**

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF 61 for potable domestic water piping and components.

**PART 2 PRODUCTS****2.01 PIPING MATERIALS**

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

**2.02 COPPER TUBE AND FITTINGS**

- A. Hard Copper Tube: ASTM B 88, Type K (ASTM B 88M), ASTM B 88, Type L (ASTM B 88M, Type B) and ASTM B 88, Type M (ASTM B 88M, Type C) water tube, drawn temper.
  - 1. Cast-Copper Solder-Joint Fittings: ASME B16.18, pressure fittings.
  - 2. Wrought-Copper Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
  - 3. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
  - 4. 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.
  - 5. Copper Pressure-Seal-Joint Fittings:
    - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Elkhart Products Corporation; Industrial Division.
      - 2) NIBCO INC.
      - 3) Viega; Plumbing and Heating Systems.
    - b. NPS 2 and Smaller: Wrought-copper fitting with EPDM-rubber O-ring seal in each end.
    - c. NPS 2-1/2 to NPS 4: Cast-bronze or wrought-copper fitting with EPDM-rubber O-ring seal in each end.
  - 6. Copper Push-on-Joint Fittings:
    - a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) NVent LLC.

- b. Description: Cast-copper fitting complying with ASME B16.18 or wrought-copper fitting complying with ASME B 16.22; with stainless-steel teeth and EPDM-rubber O-ring seal in each end instead of solder-joint ends.

### 2.03 PIPING JOINING MATERIALS

- A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free, unless otherwise indicated; full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

### 2.04 SPECIALTY VALVES

- A. Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for general-duty metal valves.
- B. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves, drain valves, backflow preventers, and vacuum breakers.

### 2.05 TRANSITION FITTINGS

- A. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
- B. Sleeve-Type Transition Coupling: AWWA C219.

### 2.06 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.
- B. Dielectric Unions:
  - 1. Description:
    - a. Pressure Rating: 150 psig at 180 deg F.
    - b. End Connections: Solder-joint copper alloy and threaded ferrous.
- C. Dielectric Flanges:
  - 1. Description:
    - a. Factory-fabricated, bolted, companion-flange assembly.
    - b. Pressure Rating: 150 psig minimum.
  - c. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
- D. Dielectric-Flange Kits:
  - 1. Description:
    - a. Nonconducting materials for field assembly of companion flanges.
    - b. Pressure Rating: 150 psig.
    - c. Gasket: Neoprene or phenolic.
    - d. Bolt Sleeves: Phenolic or polyethylene.
    - e. Washers: Phenolic with steel backing washers.
- E. Dielectric Nipples:
  - 1. Description:
    - a. Electroplated steel nipple.
    - b. Pressure Rating: 300 psig at 225 deg F.
    - c. End Connections: Male threaded or grooved.
    - d. Lining: Inert and noncorrosive, propylene.

**2.07 FLEXIBLE CONNECTORS**

- A. Bronze-Hose Flexible Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.
  - 1. Working-Pressure Rating: Minimum 200 psig.
  - 2. End Connections NPS 2 and Smaller: Threaded copper pipe or plain-end copper tube.
  - 3. End Connections NPS 2-1/2 and Larger: Flanged copper alloy.
- B. Stainless-Steel-Hose Flexible Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.
  - 1. Working-Pressure Rating: Minimum 200 psig.
  - 2. End Connections NPS 2 and Smaller: Threaded steel-pipe nipple.
  - 3. End Connections NPS 2-1/2 and Larger: Flanged steel nipple.

**2.08 WATER METERS**

- A. Displacement-Type Water Meters:
  - 1. Description:
    - a. Standard: AWWA C700.
    - b. Pressure Rating: 150-psig working pressure.
    - c. Body Design: Nutating disc; totalization meter.
    - d. Registration: In gallons or cubic feet as required by utility.
    - e. Case: Bronze.
    - f. End Connections: Threaded.

**PART 3 EXECUTION****3.01 EARTHWORK**

- A. Comply with requirements in Division 31 Sections for excavating, trenching, and backfilling.

**3.02 PIPING INSTALLATION**

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- C. Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA M41.
- D. Install shutoff valve, hose-end drain valve, strainer, pressure gage, and test tee with valve, inside the building at each domestic water service entrance. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for drain valves and strainers.
- E. Install shutoff valve immediately upstream of each dielectric fitting.
- F. Install water-pressure-reducing valves downstream from shutoff valves. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for pressure-reducing valves.
- G. Install domestic water piping level with 0.25 percent slope downward toward drain and plumb.
- H. Rough-in domestic water piping for water-meter installation according to utility company's requirements.
- I. Install seismic restraints on piping. Comply with requirements in Division 22 Section "Vibration and Seismic Controls for Plumbing Piping and Equipment" for seismic-restraint devices.
- J. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- K. 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.



- L. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- M. Install piping adjacent to equipment and specialties to allow service and maintenance.
- N. Install piping to permit valve servicing.
- O. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.
- P. Install piping free of sags and bends.
- Q. Install fittings for changes in direction and branch connections.
- R. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- S. Install thermostats in hot-water circulation piping.
- T. Install thermometers on outlet piping from each water heater.
- U. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."
- V. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."
- W. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 22 Section "Escutcheons for Plumbing Piping."

### 3.03 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. 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.
  - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- D. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Braze Joints" Chapter.
- E. Soldered Joints: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- F. Pressure-Sealed Joints: Join copper tube and pressure-seal fittings with tools recommended by fitting manufacturer.
- G. Copper-Tubing, Push-on Joints: Clean end of tube. Measure insertion depth with manufacturer's depth gage. Join copper tube and push-on-joint fittings by inserting tube to measured depth.
- H. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- I. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

### 3.04 VALVE INSTALLATION

- A. General-Duty Valves: Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping" for valve installations.

- B. Install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have 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.
- C. Install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping. Drain valves are specified in Division 22 Section "Domestic Water Piping Specialties."
  - 1. Hose-End Drain Valves: At low points in water mains, risers, and branches.
  - 2. Stop-and-Waste Drain Valves: Instead of hose-end drain valves where indicated.
- D. Install balancing valve in each hot-water circulation return branch and discharge side of each pump and circulator. Set balancing valves partly open to restrict but not stop flow. Use ball valves for piping NPS 2 and smaller and butterfly valves for piping NPS 2-1/2 and larger. Comply with requirements in Division 22 Section "Domestic Water Piping Specialties" for balancing valves.

### 3.05 TRANSITION FITTING INSTALLATION

- A. Install transition couplings at joints of dissimilar piping.
- B. Transition Fittings in Underground Domestic Water Piping:
  - 1. NPS 1-1/2 and Smaller: Fitting-type coupling.
  - 2. NPS 2 and Larger: Sleeve-type coupling.
- C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition fittings or unions.

### 3.06 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.
- C. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges.
- D. Dielectric Fittings for NPS 5 to NPS 6: Use dielectric flange kits.

### 3.07 FLEXIBLE CONNECTOR INSTALLATION

- A. Install bronze-hose flexible connectors in copper domestic water tubing.
- B. Install stainless-steel-hose flexible connectors in steel domestic water piping.

### 3.08 WATER METER INSTALLATION

- A. Rough-in domestic water piping for water meter installation, according to utility company's requirements.
- B. Water meters will be furnished and installed by utility company.
- C. Install water meters according to AWWA M6, utility company's requirements, and the following:
- D. Install displacement-type water meters with shutoff valve on water-meter inlet. Install valve on water-meter outlet and valved bypass around meter unless prohibited by authorities having jurisdiction.
- E. Install compound-type water meters with shut off valves on water-meter inlet and outlet and on valved bypass around meter. Support meters, valves, and piping on brick or concrete piers.
- F. Install remote registration system according to standards of utility company and of authorities having jurisdiction.

### 3.09 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment" for pipe hanger and support products and installation.
  - 1. Vertical Piping: MSS Type 8 or 42, clamps.
  - 2. Individual, Straight, Horizontal Piping Runs:
    - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.

3. Base of Vertical Piping: MSS Type 52, spring hangers.
- B. Support vertical piping and tubing at base and at each floor.
- C. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- D. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
  1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
  2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
  3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
- E. Install supports for vertical copper tubing every 10 feet.
- F. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

### 3.10 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 water-service piping with shutoff valve; extend and connect to the following:
  1. Water Heaters: Cold-water inlet 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. Comply with requirements in Division 22 plumbing fixture Sections for connection sizes.
  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.

### 3.11 IDENTIFICATION

- A. Identify system components. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment" for identification materials and installation.
- B. Label pressure piping with system operating pressure.

### 3.12 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Piping Inspections:
  1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
  2. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
    - 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 final inspection for 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 tests or inspections, make required corrections and arrange for reinspection.
  4. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- C. Piping Tests:
  1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.

2. 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 a separate report for each test, complete with diagram of portion of piping tested.
  3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
  4. 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.
  5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
  6. Prepare reports for tests and for corrective action required.
- D. Domestic water piping will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

### 3.13 CLEANING

- A. Clean and disinfect potable domestic water piping as follows:
1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
  2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures 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.

### 3.14 PIPING SCHEDULE

- 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 and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Under-building-slab, domestic water, building service piping, NPS 3 and smaller shall be the following:
  1. Hard copper tube, ASTM B 88, Type K; wrought-copper solder-joint fittings; and brazed joints.
- D. Aboveground domestic water piping, NPS 2 and smaller, shall be the following:
  1. Hard copper tube, ASTM B 88, Type L; wrought-copper solder-joint fittings; and soldered joints.

### 3.15 VALVE SCHEDULE

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
  1. Shutoff Duty: Use ball or gate valves for piping NPS 2 and smaller. Use butterfly, ball, or gate valves with flanged ends for piping NPS 2-1/2 and larger.

2. Throttling Duty: Use ball or globe valves for r piping NPS 2 and smaller. Use butterfly or ball valves with flanged ends for piping NPS 2-1/2 and larger.
  3. Hot-Water Circulation Piping, Balancing Duty: Memory-stop balancing valves.
  4. Drain Duty: Hose-end drain valves.
- B. Use check valves to maintain correct direction of domestic water flow to and from equipment.
- C. Iron grooved-end valves may be used with grooved-end piping.

**END OF SECTION**

**SECTION 22 1119**  
**DOMESTIC WATER PIPING SPECIALTIES**

**PART 1 GENERAL****1.01 SUMMARY**

- A. This Section includes the following domestic water piping specialties:
  - 1. Vacuum breakers.
  - 2. Backflow preventers.
  - 3. Water pressure-reducing valves.
  - 4. Balancing valves.
  - 5. Temperature-actuated water mixing valves.
  - 6. Strainers.
  - 7. Hose bibbs.
  - 8. Wall hydrants.
  - 9. Drain valves.
  - 10. Water hammer arresters.
  - 11. Trap-seal primer valves.
- B. See Division 22 Section "Domestic Water Piping" for water meters.

**1.02 PERFORMANCE REQUIREMENTS**

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 60 psig, unless otherwise indicated.

**1.03 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Field quality-control test reports.
- C. Operation and maintenance data.

**1.04 QUALITY ASSURANCE**

- A. NSF Compliance:
  - 1. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic domestic water piping components.
  - 2. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9."

**PART 2 PRODUCTS****2.01 VACUUM BREAKERS**

- A. Pipe-Applied, Atmospheric-Type Vacuum Breakers:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Zurn Plumbing Products Group; Wilkins Div.
    - b. Watts Industries, Inc.; Water Products Div.
    - c. Conbraco Industries, Inc.
  - 2. Standard: ASSE 1001.
  - 3. Size: NPS 1/4 to NPS 3, as required to match connected piping.
  - 4. Body: Bronze.
  - 5. Inlet and Outlet Connections: Threaded.
  - 6. Finish: Rough bronze.
- B. Hose-Connection Vacuum Breakers:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Zurn Plumbing Products Group; Light Commercial Operation.
    - b. Watts Industries, Inc.; Water Products Div.

- c. Conbraco Industries, Inc.
- d. MIFAB, Inc.
- e. Woodford Manufacturing Company.
- 2. Standard: ASSE 1001.
- 3. Body: Bronze, nonremovable, with manual drain.
- 4. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
- 5. Finish: **Rough bronze.**

## 2.02 BACKFLOW PREVENTERS

- A. Intermediate Atmospheric-Vent Backflow Preventers:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Watts Industries, Inc.; Water Products Div.
    - b. Zurn Plumbing Products Group; Wilkins Div.
    - c. Conbraco Industries, Inc.
    - d. Honeywell Water Controls.
  - 2. Standard: ASSE 1012.
  - 3. Operation: Continuous-pressure applications.
  - 4. Size: NPS 3/4.
  - 5. Body: Bronze.
  - 6. End Connections: Solder joint.
  - 7. Finish: Rough bronze.
- B. Reduced-Pressure-Principle Backflow Preventers:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Watts Industries, Inc.; Water Products Div.
    - b. Zurn Plumbing Products Group; Wilkins Div.
    - c. Conbraco Industries, Inc.
  - 2. Standard: ASSE 1013.
  - 3. Operation: Continuous-pressure applications.
  - 4. Pressure Loss: 12 psig maximum, through middle 1/3 of flow range.
  - 5. Body: Bronze for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved for NPS 2-1/2 and larger.
  - 6. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
  - 7. Configuration: Designed for horizontal, straight through flow.
  - 8. Accessories:
    - a. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 and smaller; outside screw and yoke gate-type with flanged ends on inlet and outlet of NPS 2-1/2 and larger.
    - b. Air-Gap Fitting: ASME A112.1.2, matching backflow-preventer connection.

## 2.03 WATER PRESSURE-REDUCING VALVES

- A. Water Regulators:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Zurn Plumbing Products Group; Wilkins Div.
    - b. Watts Industries, Inc.; Water Products Div.
    - c. Conbraco Industries, Inc.
  - 2. Standard: ASSE 1003.
  - 3. Pressure Rating: Initial working pressure of 150 psig.
  - 4. Body: Bronze for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or that is FDA approved for NPS 2-1/2 and NPS 3.
  - 5. Valves for Booster Heater Water Supply: Include integral bypass.
  - 6. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and NPS 3.

## 2.04 BALANCING VALVES

- A. Memory-Stop Balancing Valves:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Bell and Gossett
    - b. Conbraco Industries, Inc.
    - c. Milwaukee Valve Company.
    - d. NIBCO INC.
  - 2. Standard: MSS SP-110 for two-piece, copper-alloy ball valves.
  - 3. Pressure Rating: 400-psig minimum CWP.
  - 4. Size: NPS 2 or smaller.
  - 5. Body: Copper alloy.
  - 6. Port: Standard or full port.
  - 7. Ball: Chrome-plated brass.
  - 8. Seats and Seals: Replaceable.
  - 9. End Connections: Solder joint or threaded.
  - 10. Handle: Vinyl-covered steel with memory-setting device.

## 2.05 TEMPERATURE-ACTUATED WATER MIXING VALVES

- A. Water-Temperature Limiting Devices:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Powers; a Watts Industries Co.
    - b. Conbraco Industries, Inc.
    - c. Honeywell Water Controls.
    - d. Leonard Valve Company.
    - e. Symmons Industries, Inc.
    - f. Taco, Inc.
    - g. Watts Industries, Inc.; Water Products Div.
    - h. Zurn Plumbing Products Group; Wilkins Div.
  - 2. Standard: ASSE 1017.
  - 3. Pressure Rating: 125 psig.
  - 4. Type: Thermostatically controlled water mixing valve.
  - 5. Material: Bronze body with corrosion-resistant interior components.
  - 6. Connections: Threaded union inlets and outlet.
  - 7. Accessories: Check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
  - 8. Tempered-Water Setting: 120 deg F.
  - 9. Valve Finish: Chrome plated.
- B. Primary, Thermostatic, Water Mixing Valves:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Powers; a Watts Industries Co.
    - b. Leonard Valve Company.
    - c. Symmons Industries, Inc.
  - 2. Standard: ASSE 1017.
  - 3. Pressure Rating: 125 psig.
  - 4. Type: Exposed-mounting, thermostatically controlled water mixing valve.
  - 5. Material: Bronze body with corrosion-resistant interior components.
  - 6. Connections: Threaded union inlets and outlet.
  - 7. Accessories: Manual temperature control, check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
  - 8. Valve Pressure Rating: 125 psig minimum, unless otherwise indicated.
  - 9. Tempered-Water Setting: 120 deg F.



10. Valve Finish: Rough bronze.
11. Piping Finish: Copper.
12. Cabinet: Factory -fabricated, stainless steel, for surface mounting and with hinged, stainless-steel door.

## 2.06 STRAINERS FOR DOMESTIC WATER PIPING

- A. Y-Pattern Strainers:
  1. Pressure Rating: 125 psig minimum, unless otherwise indicated.
  2. Body: Bronze for NPS 2 and smaller; cast iron with interior lining complying with AWWA C550 or FDA-approved, epoxy coating and for NPS 2-1/2 and larger.
  3. End Connections: Threaded for NPS 2 and smaller; flanged for NPS 2-1/2 and larger.
  4. Screen: Stainless steel with round perforations, unless otherwise indicated.
  5. Perforation Size:
    - a. Strainers NPS 2 and Smaller: 0.020 inch.
  6. Drain: Factory-installed, hose-end drain valve.

## 2.07 HOSE BIBBS

- A. Hose Bibbs:
  1. Standard: ASME A112.18.1 for sediment faucets.
  2. Body Material: Bronze.
  3. Seat: Bronze, replaceable.
  4. Supply Connections: NPS 3/4 threaded or solder-joint inlet.
  5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
  6. Pressure Rating: 125 psig.
  7. Vacuum Breaker: Integral or field-installation, nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
  8. Finish for Equipment Rooms: Rough bronze, or chrome or nickel plated.
  9. Finish for Service Areas: Chrome or nickel plated.
  10. Finish for Finished Rooms: Chrome or nickel plated.
  11. Operation for Equipment Rooms: Wheel handle or operating key.
  12. Operation for Service Areas: Operating key.
  13. Operation for Finished Rooms: Operating key.
  14. Include operating key with each operating-key hose bibb.
  15. Include integral wall flange with each chrome- or nickel-plated hose bibb.

## 2.08 WALL HYDRANTS

- A. Nonfreeze Wall Hydrants:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Zurn Plumbing Products Group; Light Commercial Operation. Josam Company.
    - b. MIFAB, Inc.
    - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
    - d. Watts Drainage Products Inc.
    - e. Woodford Manufacturing Company.
  2. Standard: ASME A112.21.3M for concealed and exposed-outlet, self-draining wall hydrants.
  3. Pressure Rating: 125 psig.
  4. Operation: Loose key.
  5. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
  6. Inlet: NPS 3/4.
  7. Outlet: Concealed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
  8. Box: Deep, flush mounting with cover.
  9. Box and Cover Finish: Chrome plated.

10. Outlet: Exposed, with integral vacuum breaker and garden-hose thread complying with ASME B1.20.7.
  11. Nozzle and Wall-Plate Finish: Polished nickel bronze.
  12. Operating Keys(s): Two with each wall hydrant.
- B. Moderate-Climate Wall Hydrants:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Zurn Plumbing Products Group; Light Commercial Operation.
    - b. Josam Company.
    - c. MIFAB, Inc.
    - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
    - e. Watts Drainage Products Inc.
    - f. Woodford Manufacturing Company.
  2. Standard: ASME A112.21.3M for concealed and exposed-outlet, self-draining wall hydrants.
  3. Pressure Rating: 125 psig.
  4. Operation: Loose key.
  5. Inlet: NPS 3/4.
  6. Outlet: Concealed, with integral vacuum breaker or nonremovable hose-connection vacuum breaker complying with ASSE 1011; and garden-hose thread complying with ASME B1.20.7.
  7. Box: Deep, flush mounting with cover.
  8. Box and Cover Finish: Chrome plated.
  9. Outlet: Exposed, with integral vacuum breaker or nonremovable hose-connection vacuum breaker complying with ASSE 1011; and garden-hose thread complying with ASME B1.20.7.
  10. Nozzle and Wall-Plate Finish: Polished nickel bronze.
  11. Operating Keys(s): Two with each wall hydrant.
- C. Vacuum Breaker Wall Hydrants:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Zurn Plumbing Products Group; Light Commercial Operation.
    - b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
    - c. Watts Industries, Inc.; Water Products Div.
    - d. Woodford Manufacturing Company.
  2. Standard: ASSE 1019, Type A or Type B.
  3. Type: Freeze-resistant, automatic draining with integral air-inlet valve.
  4. Classification: Type A, for automatic draining with hose removed or Type B, for automatic draining with hose removed or with hose attached and nozzle closed.
  5. Pressure Rating: 125 psig.
  6. Operation: Loose key.
  7. Casing and Operating Rod: Of length required to match wall thickness. Include wall clamp.
  8. Inlet: NPS 3/4.
  9. Outlet: Exposed with garden-hose thread complying with ASME B1.20.7.

## 2.09 DRAIN VALVES

- A. Ball-Valve-Type, Hose-End Drain Valves:
1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
  2. Pressure Rating: 400-psig minimum CWP.
  3. Size: NPS 3/4.
  4. Body: Copper alloy.
  5. Ball: Chrome-plated brass.
  6. Seats and Seals: Replaceable.

7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.

## 2.10 WATER HAMMER ARRESTERS

### A. Water Hammer Arresters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. MIFAB, Inc.
  - b. PPP Inc.
  - c. Sioux Chief Manufacturing Company, Inc.
  - d. AMTROL, Inc.
  - e. Josam Company.
  - f. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - g. Watts Drainage Products Inc.
  - h. Zurn Plumbing Products Group; Specification Drainage Operation.
2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Copper tube with piston.
4. Size: ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.

## 2.11 TRAP-SEAL PRIMER VALVES

### A. Supply-Type, Trap-Seal Primer Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. MIFAB, Inc.
  - b. PPP Inc.
  - c. Sioux Chief Manufacturing Company, Inc.
  - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
  - e. Watts Industries, Inc.; Water Products Div.
2. Standard: ASSE 1018.
3. Pressure Rating: 125 psig minimum.
4. Body: Bronze.
5. Inlet and Outlet Connections: NPS 1/2 threaded, union, or solder joint.
6. Gravity Drain Outlet Connection: NPS 1/2 threaded or solder joint.
7. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Refer to Division 22 Sections for piping joining materials, joint construction, and basic installation requirements.
- B. Install backflow preventers in each water supply to mechanical equipment and systems and to other equipment and water systems that may be sources of contamination. Comply with authorities having jurisdiction.
  1. Locate backflow preventers in same room as connected equipment or system.
  2. Install drain for backflow preventers with atmospheric-vent drain connection with air-gap fitting, fixed air-gap fitting, or equivalent positive pipe separation of at least two pipe diameters in drain piping and pipe to floor drain. Locate air-gap device attached to or under backflow preventer. Simple air breaks are not acceptable for this application.
  3. Do not install bypass piping around backflow preventers.
- C. Install water regulators with inlet and outlet shutoff valves. Install pressure gages on inlet and outlet.
- D. Install balancing valves in locations where they can easily be adjusted.

- E. Install temperature-actuated water mixing valves with check stops or shutoff valves on inlets and with shutoff valve on outlet.
  - 1. Install thermometers and water regulators if specified.
  - 2. Install cabinet-type units recessed in or surface mounted on wall as specified.
- F. Install Y-pattern strainers for water on supply side of each water pressure-reducing valve.
- G. Install water hammer arresters in water piping according to PDI-WH 201.
- H. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.
- I. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping and specialties.
- J. Equipment Nameplates and Signs: In stall engraved plastic-laminate equipment nameplate or sign on or near each of the following:
  - 1. Intermediate atmospheric-vent backflow preventers.
  - 2. Reduced-pressure-principle backflow preventers.
  - 3. Double-check backflow-prevention assemblies.
  - 4. Water pressure-reducing valves.
  - 5. Primary, thermostatic, water mixing valves.
  - 6. Supply-type, trap-seal primer valves.
- K. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

### **3.02 FIELD QUALITY CONTROL**

- A. Perform the following tests and prepare test reports:
  - 1. Test each reduced-pressure-principle backflow preventer according to authorities having jurisdiction and the device's reference standard.
- B. Remove and replace malfunctioning domestic water piping specialties and retest as specified above.

### **3.03 ADJUSTING**

- A. Set field-adjustable pressure set points of water pressure-reducing valves.
- B. Set field-adjustable flow of balancing valves.
- C. Set field-adjustable temperature set points of temperature-actuated water mixing valves.

**END OF SECTION**

**SECTION 22 1316**  
**SANITARY WASTE AND VENT PIPING**

**PART 1 GENERAL****1.01 SUMMARY**

- A. Section Includes:
  - 1. Pipe, tube, and fittings.
  - 2. Specialty pipe fittings.

**1.02 PERFORMANCE REQUIREMENTS**

- A. Seismic Performance: Soil, waste, and vent piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

**1.03 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Seismic Qualification Certificates: For waste and vent piping, accessories, and components, from manufacturer.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  - 2. Detailed description of piping anchorage devices on which the certification is based and their installation requirements.
- C. Field quality-control reports.

**1.04 QUALITY ASSURANCE**

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.
- B. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.
- C. Cast Iron soil pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and be listed by NSF international.
- D. All couplings for hubless cast iron soil pipe and fittings shall meet the requirements of CISPI 310 and be certified by NSF international.

**PART 2 PRODUCTS****2.01 PIPING MATERIALS**

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

**2.02 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS**

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.
- B. CISPI, Hubless-Piping Couplings:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ANACO-Husky.
    - b. Dallas Specialty & Mfg. Co.
    - c. Fernco Inc.
    - d. Matco-Norca, Inc.
    - e. MIFAB, Inc.
    - f. Mission Rubber Company; a division of MCP Industries, Inc.
    - g. Stant.
    - h. Tyler Pipe.
  - 2. Standards: ASTM C 1277 and CISPI 310.
  - 3. Description: Stainless-steel corrugated shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

- C. Heavy-Duty, Hubless-Piping Couplings:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ANACO-Husky.
    - b. Clamp-All Corp.
    - c. Dallas Specialty & Mfg. Co.
    - d. MIFAB, Inc.
    - e. Mission Rubber Company; a division of MCP Industries, Inc.
    - f. Stant.
    - g. Tyler Pipe.
  2. Standards: ASTM C 1277 and ASTM C 1540.
  3. Description: Stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

### 2.03 COPPER TUBE AND FITTINGS

- A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.
- B. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.
- C. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.
  1. Flange Gasket Materials: ASME B16.21, full-face, flat, nonmetallic, asbe stos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
  2. Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- D. Solder: ASTM B 32, lead free with ASTM B 813, water-flushable flux.

### 2.04 ABS PIPE AND FITTINGS

- A. Solid-Wall ABS Pipe: ASTM D 2661, Schedule 40.
- B. Cellular-Core ABS Pipe: ASTM F 628, Schedule 40.
- C. ABS Socket Fittings: ASTM D 2661, made to ASTM D 3311, drain, waste, and vent patterns.
- D. Solvent Cement: ASTM D 2235.
  1. ABS solvent cement shall have a V OC content of 325 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

### 2.05 SPECIALTY PIPE FITTINGS

- A. Transition Couplings:
  1. General Requirements: Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.
  2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
  3. Unshielded, Nonpressure Transition Couplings:
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Dallas Specialty & Mfg. Co.
      - 2) Fernco Inc.
      - 3) Mission Rubber Company; a division of MCP Industries, Inc.
      - 4) Plastic Oddities; a division of Diverse Corporate Technologies, Inc.
    - b. Standard: ASTM C 1173.
    - c. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
    - d. Sleeve Materials:
      - 1) For Cast-Iron Soil Pipes: ASTM C 564, rubber.
      - 2) For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.

- 3) For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
4. Shielded, Nonpressure Transition Couplings:
  - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1) Cascade Waterworks Mfg. Co.
    - 2) Mission Rubber Company; a division of MCP Industries, Inc.
  - b. Standard: ASTM C 1460.
  - c. Description: Elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

### **PART 3 EXECUTION**

#### **3.01 EARTH MOVING**

- A. Comply with requirements for excavating, trenching, and backfilling specified in Division 31 Sections.

#### **3.02 PIPING INSTALLATION**

- A. 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.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- 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 above accessible ceilings to allow sufficient space for ceiling panel removal.
- 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. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Division 23 Section "Vibration and Seismic Controls for HV AC Piping and Equipment."
- I. 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 two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. 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.
- J. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- K. 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; 2 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: 2 percent down toward vertical fixture vent or toward vent stack.
- L. 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."
- M. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."
- N. Install underground ABS piping according to ASTM D 2321.
- O. Plumbing Specialties:
  1. Install backwater valves in sanitary waste gravity-flow piping. Comply with requirements for backwater valves specified in Division 22 Section "Sanitary Waste Piping Specialties."
  2. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary drainage gravity-flow piping. Comply with requirements for cleanouts specified in Division 22 Section "Sanitary Waste Piping Specialties."
  3. Install drains in sanitary drainage gravity-flow piping. Comply with requirements for drains specified in Division 22 Section "Sanitary Waste Piping Specialties."
- P. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.
- Q. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."
- R. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."
- S. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 22 Section "Escutcheons for Plumbing Piping."

### 3.03 JOINT CONSTRUCTION

- A. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.
- B. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.
- C. Join copper tube and fittings with soldered joints according to ASTM B 828. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.
- D. Flanged Joints: Align bolt holes. Select appropriate gasket material, size, type, and thickness. Install gasket concentrically positioned. Use suitable lubricants on bolt threads. Torque bolts in cross pattern.
- E. Plastic, Nonpressure-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.

### 3.04 SPECIALTY PIPE FITTING INSTALLATION

- A. Transition Couplings:
  1. Install transition couplings at joints of piping with small differences in OD's.
  2. In Drainage Piping: Unshielded, nonpressure transition couplings.

### 3.05 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements for seismic-restraint devices specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- B. Comply with requirements for pipe hanger and support devices and installation specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."
  1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
  2. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.



3. Vertical Piping: MSS Type 8 or Type 42, clamps.
  4. Install individual, straight, horizontal piping runs:
    - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
  5. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
  6. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Support horizontal piping and tubing within 12 inches of each fitting, valve, and coupling.
- D. Support vertical piping and tubing at base and at each floor.
- E. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.
- F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
  2. NPS 3: 60 inches with 1/2-inch rod.
  3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
  4. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.
- G. Install supports for vertical cast-iron soil piping every 15 feet.
- H. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
1. NPS 1-1/4: 72 inches with 3/8-inch rod.
  2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
  3. NPS 2-1/2: 108 inches with 1/2-inch rod.
  4. NPS 3 and NPS 5: 10 feet with 1/2-inch rod.
- I. Install supports for vertical copper tubing every 10 feet.
- J. Install hangers for ABS piping with the following maximum horizontal spacing and minimum rod diameters:
1. NPS 1-1/2 and NPS 2: 48 inches with 3/8-inch rod.
  2. NPS 3: 48 inches with 1/2-inch rod.
  3. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
  4. NPS 6 and NPS 8: 48 inches with 3/4-inch rod.
- K. Install supports for vertical ABS piping every 48 inches.
- L. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

### 3.06 CONNECTIONS

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. 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.
  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.
  4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
  5. Comply with requirements for cleanouts and drains specified in Division 22 Section "Sanitary Waste Piping Specialties."

6. 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.
- D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.
- E. 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.

### 3.07 IDENTIFICATION

- A. Identify exposed sanitary waste and vent piping. Comply with requirements for identification specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

### 3.08 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 or, in absence of published procedures, 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 drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
  3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water for minimum of 1 hour duration. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
  4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.
  5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
  6. Prepare reports for tests and required corrective action.

### 3.09 CLEANING AND PROTECTION

- 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.

- D. Exposed ABS Piping: Protect plumbing vents exposed to sunlight with two coats of water-based latex paint.

**3.10 PIPING SCHEDULE**

- A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.
- B. Aboveground, soil and waste piping NPS 4 and smaller shall be the following:
  - 1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
  - 2. Hubless, cast-iron soil pipe and fittings ; CISPI hubless-piping couplings; and coupled joints.
- C. Aboveground, vent piping NPS 4 and smaller shall be the following:
  - 1. Hubless, cast-iron soil pipe and fittings ; CISPI hubless-piping couplings; and coupled joints.
- D. Underground, soil, waste, and vent piping NPS 4 and smaller shall be the following:
  - 1. Solid wall Cellular-core ABS pipe, ABS socket fittings, and solvent-cemented joints.
- E. Aboveground condensate drain:
  - 1. Copper DWV tube, copper drainage fittings, and soldered joints.

**END OF SECTION**

**SECTION 22 1319**  
**SANITARY WASTE PIPING SPECIALTIES**

**PART 1 GENERAL****1.01 SUMMARY**

- A. This Section includes the following sanitary drainage piping specialties:
1. Cleanouts.
  2. Floor drains, floor sinks.
  3. Miscellaneous sanitary drainage piping specialties.

**1.02 SUBMITTALS**

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and accessories for grease interceptors.

**1.03 QUALITY ASSURANCE**

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

**PART 2 PRODUCTS****2.01 CLEANOUTS**

- A. Exposed Cast-Iron Cleanouts:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Josam Company; Josam Div.
    - b. MIFAB, Inc.
    - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
    - d. Tyler Pipe; Wade Div.
    - e. Watts Drainage Products Inc.
    - f. Zurn Plumbing Products Group; Specification Drainage Operation.
  2. Standard: ASME A112.36.2M for cast iron for cleanout test tee.
  3. Size: Same as connected drainage piping
  4. Body Material: Hubless, cast-iron soil pipe test tee as required to match connected piping.
  5. Closure: Countersunk, brass plug.
  6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
- B. Cast-Iron Floor Cleanouts:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Josam Company; Josam Div.
    - b. Oatey.
    - c. Sioux Chief Manufacturing Company, Inc.
    - d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
    - e. Tyler Pipe; Wade Div.
    - f. Watts Drainage Products Inc.
    - g. Zurn Plumbing Products Group; Light Commercial Operation.
    - h. Zurn Plumbing Products Group; Specification Drainage Operation.
  2. Standard: ASME A112.36.2M for heavy-duty, adjustable housing cleanout.
  3. Size: Same as connected branch.
  4. Type: Heavy-duty, adjustable housing.
  5. Body or Ferrule: Cast iron.
  6. Clamping Device: Not required.
  7. Outlet Connection: Inside call.
  8. Closure: Brass plug with straight threads and gasket.
  9. Adjustable Housing Material: Cast iron with threads.
  10. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.

11. Frame and Cover Shape: Round.
  12. Top Loading Classification: Extra Heavy Duty.
  13. Riser: ASTM A 74, Extra-Heavy class, cast-iron drainage pipe fitting and riser to cleanout.
- C. Cast-Iron Wall Cleanouts:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Josam Company; Josam Div.
    - b. MIFAB, Inc.
    - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
    - d. Tyler Pipe; Wade Div.
    - e. Watts Drainage Products Inc.
    - f. Zurn Plumbing Products Group; Specification Drainage Operation.
  2. Standard: ASME A112.36.2M. Include wall access.
  3. Size: Same as connected drainage piping.
  4. Body: Hubless, cast-iron soil pipe test tee as required to match connected piping.
  5. Closure: Countersunk, brass plug.
  6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
  7. Wall Access: Round, flat, chrome-plated brass or stainless-steel cover plate with screw.
  8. Wall Access: Round, nickel-bronze, copper-alloy, or stainless-steel wall-installation frame and cover.

## 2.02 FLOOR DRAINS

- A. Cast-Iron Floor Drains:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Zurn Plumbing Products Group; Light Commercial Operation.
    - b. Zurn Plumbing Products Group; Specification Drainage Operation.
    - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
    - d. Watts Drainage Products Inc.
  2. Standard: ASME A112.6.3.
  3. Pattern: Floor drain.
  4. Body Material: Gray iron.
  5. Seepage Flange: Required.
  6. Anchor Flange: Required.
  7. Clamping Device: Required.
  8. Outlet: Bottom.
  9. Backwater Valve: Not required.
  10. Coating on Interior and Exposed Exterior Surfaces: Acid-resistant enamel.
  11. Sediment Bucket: Not required.
  12. Top or Strainer Material: Nickel bronze.
  13. Top of Body and Strainer Finish: Nickel bronze.
  14. Top Shape: Round.
  15. Top Loading Classification: Heavy Duty.
  16. Inlet Fitting: Gray iron, with threaded in let and threaded or spigot outlet, and trap-seal primer valve connection.
  17. Trap Material: Cast iron.
  18. Trap Pattern: Standard P-trap.
  19. Trap Features: Trap-seal primer valve drain connection.
- B. Cast-Iron Floor Sinks:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Josam Company; Josam Div.
    - b. MIFAB, Inc.
    - c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.

- d. Watts Drainage Products Inc.
- e. Zurn Plumbing Products Group; Light Commercial Operation.
- f. Zurn Plumbing Products Group; Specification Drainage Operation.
- 2. Standard: ASME A112.6.3.
- 3. Pattern: Floor sink.
- 4. Body Material: Cast iron.
- 5. Outlet: Bottom.
- 6. Backwater Valve: Not required.
- 7. Coating on Interior and Exposed Exterior Surfaces: Acid-resistant enamel.
- 8. Sediment Bucket: Not required.
- 9. Top Shape: Square.
- 10. Top Loading Classification: Light Duty.
- 11. Funnel: Not required.
- 12. Inlet Fitting: Gray iron, with threaded in let and threaded or spigot outlet, and trap-seal primer valve connection.
- 13. Trap Material: Cast iron.
- 14. Trap Pattern: Standard P-trap.
- 15. Trap Features: Trap-seal primer valve drain connection.

### 2.03 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

- A. Garbage Disposal.
  - 1. Manufacturers:
    - a. In-sink-erator.
    - b. Approved equivalent.
  - 2. Continuous feed, ½ HP induction motor, cast nickel chrome alloy cutting elements, stainless steel grind chamber, stainless steel and chrome plated finish.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
  - 1. Size same as drainage piping up to NPS 4 (DN 100). Use NPS 4 (DN 100) for larger drainage piping unless larger cleanout is indicated.
  - 2. Locate at each change in direction of piping greater than 45 degrees.
  - 3. Locate at minimum intervals of 50 feet (15 m) for piping NPS 4 (DN 100) and smaller and 100 feet (30 m) for larger piping.
  - 4. Locate at base of each vertical soil and waste stack.
- B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- D. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
  - 1. Position floor drains for easy access and maintenance.
  - 2. Set floor drains below elevation of surrounding finished floor to allow floor drainage. Set with grates depressed according to the following drainage area radii:
    - a. Radius, 30 Inches (750 mm) or Less: Equivalent to 1 percent slope, but not less than 1/4-inch (6.35-mm) total depression.
    - b. Radius, 30 to 60 Inches (750 to 1500 mm): Equivalent to 1 percent slope.
    - c. Radius, 60 Inches (1500 mm) or Larger: Equivalent to 1 percent slope, but not greater than 1-inch (25-mm) total depression.
  - 3. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.

4. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.
- E. Install deep-seal traps on floor drains and other waste outlets, if indicated.
- F. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.
  1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
  2. Size: Same as floor drain inlet.
- G. Install vent caps on each vent pipe passing through roof.
- H. Install interceptors, including trapping, and venting according to authorities having jurisdiction and with clear space for servicing.
  1. Install cleanout immediately downstream from interceptors not having integral cleanout on outlet.

### **3.02 CONNECTIONS**

- A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.
- C. Interceptors: Connect inlet and outlet to unit, and connect vent to unit inlet piping. Install valve on outlet of automatic drawoff-type unit.

### **3.03 LABELING AND IDENTIFYING**

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each grease interceptor.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

### **3.04 PROTECTION**

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

**END OF SECTION**

**SECTION 22 1513**  
**GENERAL-SERVICE COMPRESSED-AIR PIPING**

**PART 1 GENERAL****1.01 SUMMARY**

- A. This Section includes piping and related specialties for general-service compressed-air systems operating at 150 psig or less.
- B. See Division 22 Section "General-Service Packaged Air Compressors and Receivers" for general-service air compressors and accessories.

**1.02 PERFORMANCE REQUIREMENTS**

- A. Seismic Performance: Compressed-air piping and support and installation shall withstand effects of seismic events determined according to SEI/ASCE 7, "Minimum Design Loads for Buildings and Other Structures."

**1.03 SUBMITTALS**

- A. Product Data: For the following:
  - 1. Pressure regulators. Include rated capacities and operating characteristics.
  - 2. Automatic drain valves.
  - 3. Filters. Include rated capacities and operating characteristics.
  - 4. Lubricators. Include rated capacities and operating characteristics.
- B. Field quality-control test reports.
- C. Operation and maintenance data.

**1.04 QUALITY ASSURANCE**

- A. ASME Compliance: Comply with ASME B31.9, "Building Services Piping," for low-pressure compressed-air piping.

**PART 2 PRODUCTS****2.01 PIPES, TUBES, AND FITTINGS**

- A. Copper Tube: ASTM B 88, Type K or L seamless, drawn-temper, water tube.
  - 1. Wrought-Copper Fittings: ASME B16.22, solder-joint pressure type or MSS SP-73, wrought copper with dimensions for brazed joints.
  - 2. Cast-Copper-Alloy Flanges: ASME B16.24, Class 150 or 300.
  - 3. Copper Unions: ASME B16.22 or MSS SP-123.
- B. Transition Couplings for Metal Piping: Metal coupling or other manufactured fitting same size as, with pressure rating at least equal to and ends compatible with, piping to be joined.

**2.02 JOINING MATERIALS**

- A. Pipe-Flange Gasket Materials: Suitable for compressed-air piping system contents.
  - 1. ASME B16.21, nonmetallic, flat, full-face, asbestos free, 1/8-inch maximum thickness.
- B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated.

**2.03 VALVES**

- A. Metal Ball, Butterfly, Check, Gate, and Globe Valves: Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping."



**2.04 DIELECTRIC FITTINGS**

- A. General Requirements for Dielectric Fittings: Combination fitting of copper alloy and ferrous materials with insulating material; suitable for system fluid, pressure, and temperature. Include threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.
- B. Dielectric Unions: Factory-fabricated union assembly, for 250-psig minimum working pressure at 180 deg F

**2.05 FLEXIBLE PIPE CONNECTORS**

- A. Bronze-Hose Flexible Pipe Connectors: Corrugated-bronze tubing with bronze wire-braid covering and ends brazed to inner tubing.
  - 1. Working-Pressure Rating: 200 psig minimum.
  - 2. End Connections, NPS 2 and Smaller: Threaded copper pipe or plain-end copper tube.
  - 3. End Connections, NPS 2-1/2 and Larger: Flanged copper alloy.
- B. Stainless-Steel-Hose Flexible Pipe Connectors: Corrugated-stainless-steel tubing with stainless-steel wire-braid covering and ends welded to inner tubing.
  - 1. Working-Pressure Rating: 200 psig minimum.
  - 2. End Connections, NPS 2 and Smaller: Threaded steel pipe nipple.
  - 3. End Connections, NPS 2-1/2 and Larger: Flanged steel nipple.

**2.06 SPECIALTIES**

- A. Safety Valves: ASME Boiler and Pressure Vessel Code: Section VIII, "Pressure Vessels," construction; National Board certified, labeled, and factory sealed; constructed of bronze body with poppet-type safety valve for compressed-air service.
  - 1. Pressure Settings: Higher than discharge pressure and same or lower than receiver pressure rating.
- B. Air-Main Pressure Regulators: Bronze body, direct acting, spring-loaded manual pressure-setting adjustment, and rated for 250-psig inlet pressure, unless otherwise indicated.
- C. Air-Line Pressure Regulators: Diaphragm operated, bronze body, direct acting, spring-loaded manual pressure-setting adjustment, and rated for 200-psig minimum inlet pressure, unless otherwise indicated.
- D. Automatic Drain Valves: Stainless-steel body and internal parts, rated for 200-psig minimum working pressure, capable of automatic discharge of collected condensate. Include mounting bracket if wall mounting is indicated.
- E. Coalescing Filters: Coalescing type with activated carbon capable of removing water and oil aerosols; with color-change dye to indicate when carbon is saturated and warning light to indicate when selected maximum pressure drop has been exceeded. Include mounting bracket if wall mounting is indicated.
- F. Mechanical Filters: Two-stage, mechanical-separation-type, air-line filters. Equip with deflector plates, resin-impregnated-ribbon-type filters with edge filtration, and drain cock. Include mounting bracket if wall mounting is indicated.

**2.07 QUICK COUPLINGS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Foster Manufacturing, Inc.
  - 2. Milton Industries, Inc.
  - 3. Parker Hannifin Corp.; Fluid Connectors Group; Quick Coupling Div.
  - 4. Schrader-Bridgeport; Amflo Div.
  - 5. Schrader-Bridgeport/Standard Thomson.
- B. General Requirements for Quick Couplings: Assembly with locking-mechanism feature for quick connection and disconnection of compressed-air hose.
- C. Automatic-Shutoff Quick Couplings: Straight-through brass body with O-ring or gasket seal and stainless-steel or nickel-plated-steel operating parts.

1. Socket End: With one-way valve and threaded inlet for connection to piping or threaded hose fitting.
  2. Plug End: Check-valve Straight-through type with barbed outlet for attaching hose.
- D. Valveless Quick Couplings: Straight-through brass body with stainless-steel or nickel-plated-steel operating parts.
1. Socket End: With O-ring or gasket seal, without valve, and with barbed inlet for attaching hose.
  2. Plug End: With barbed outlet for attaching hose.

## 2.08 HOSE ASSEMBLIES

- A. Description: Compatible hose, clamps, couplings, and splices suitable for compressed-air service, of nominal diameter indicated, and rated for 300-psi minimum working pressure, unless otherwise indicated.
1. Hose: Reinforced single-wire-braid, CR-covered hose for compressed-air service.
  2. Hose Clamps: Stainless-steel clamps or bands.
  3. Hose Couplings: Two-piece, straight-through, threaded brass or stainless-steel O-ring or gasket-seal swivel coupling with barbed ends for connecting two sections of hose.
  4. Hose Splicers: One-piece, straight-through brass or stainless-steel fitting with barbed ends for connecting two sections of hose.

## PART 3 EXECUTION

### 3.01 PIPING APPLICATIONS

- A. Compressed-Air Piping between Air Compressors and Receivers: Use the following piping materials for each size range:
1. NPS 2 and Smaller: Type L, copper tube; wrought-copper fittings; and brazed joints.
- B. Low-Pressure Compressed-Air Distribution Piping: Use the following piping materials for each size range:
1. NPS 2 and Smaller: Type L, copper tube; wrought-copper fittings; and brazed or soldered joints.
- C. Drain Piping: Use the following piping materials:
1. NPS 2 and Smaller: Type L (Type B) copper tube; wrought-copper fittings; and brazed or soldered joints.

### 3.02 VALVE APPLICATIONS

- A. Comply with requirements in "Valve Applications" Article in Division 22 Section "General-Duty Valves for Plumbing Piping."
- B. Equipment Isolation Valves: Safety-exhaust, copper-alloy ball valve with exhaust vent and pressure rating at least as great as piping system operating pressure.

### 3.03 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of compressed-air piping. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, air-compressor sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Install piping concealed from view and protected from physical contact by building occupants, unless otherwise indicated and except in equipment rooms and service areas.
- 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 otherwise indicated.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal and to coordinate with other services occupying that space.
- E. Install piping adjacent to equipment and machines to allow service and maintenance.
- F. Install air and drain piping with 1 percent slope downward in direction of flow.

- G. Install nipples, flanges, unions, transition and special fittings, and valves with pressure ratings same as or higher than system pressure rating, unless otherwise indicated.
- H. Equipment and Specialty Flanged Connections:
  - 1. Use cast-copper-alloy companion flange with gasket and brazed or soldered joint for connection to copper tube. Do not use soldered joints for connection to air compressors or to equipment or machines producing shock or vibration.
- I. Install branch connections to compressed-air mains from top of main. Provide drain leg and drain trap at end of each main and branch and at low points.
- J. Install thermometer and pressure gage on discharge piping from each air compressor and on each receiver.
- K. Install piping to permit valve servicing.
- L. Install piping free of sags and bends.
- M. Install fittings for changes in direction and branch connections.
- N. Install seismic restraints on piping. Seismic-restraint devices are specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- O. Install unions, adjacent to each valve and at final connection to each piece of equipment and machine.
- P. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."
- Q. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."
- R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 22 Section "Escutcheons for Plumbing Piping."

### 3.04 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from pipe and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Apply appropriate tape or thread compound to external pipe threads.
- D. Brazed Joints for Copper Tubing: Join according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.
- E. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Join according to ASTM B 828 or CDA's "Copper Tube Handbook."
- F. Flanged Joints: Use asbestos-free, nonmetallic gasket suitable for compressed air. Join flanges with gasket and bolts according to ASME B31.9 for bolting procedure.
- G. Dissimilar Metal Piping Material Joints: Use dielectric fittings.

### 3.05 VALVE INSTALLATION

- A. General-Duty Valves: Comply with requirements in Division 22 Section "General-Duty Valves for Plumbing Piping."
- B. Install shutoff valves and unions or flanged joints at compressed-air piping to air compressors.
- C. Install shutoff valve at inlet to each automatic drain valve, filter, lubricator, and pressure regulator.
- D. Install check valves to maintain correct direction of compressed-air flow to and from compressed-air piping specialties and equipment.

### 3.06 DIELECTRIC FITTING INSTALLATION

- A. Install dielectric unions in piping at connections of dissimilar metal piping and tubing.

**3.07 FLEXIBLE PIPE CONNECTOR INSTALLATION**

- A. Install flexible pipe connectors in discharge piping and in inlet air piping from remote air-inlet filter of each air compressor.
- B. Install bronze-hose flexible pipe connectors in copper compressed-air tubing.
- C. Install stainless-steel-hose flexible pipe connectors in steel compressed-air piping.

**3.08 SPECIALTY INSTALLATION**

- A. Install safety valves on receivers in quantity and size to relieve at least the capacity of connected air compressors.
- B. Install air-main pressure regulators in compressed-air piping at or near air compressors.
- C. Install air-line pressure regulators in branch piping to equipment.
- D. Install automatic drain valves on aftercoolers, receivers, and dryers. Discharge condensate onto nearest floor drain.
- E. Install coalescing filters in compressed-air piping at or near air compressors and upstream from mechanical filters. Mount on wall at locations indicated.
- F. Install mechanical filters in compressed-air piping at or near air compressors and downstream from coalescing filters. Mount on wall at locations indicated.
- G. Install quick couplings at piping terminals for hose connections.
- H. Install hose assemblies at hose connections.

**3.09 HANGER AND SUPPORT INSTALLATION**

- A. Comply with requirements in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" for seismic-restraint devices.
- B. Comply with requirements in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment" for pipe hanger and support devices.
- C. Vertical Piping: MSS Type 8 or 42, clamps.
- D. Individual, Straight, Horizontal Piping Runs:
  - 1. 100 Feet or Less: MSS Type 1, adjustable, steel clevis hangers.
  - 2. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
- E. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
- F. Base of Vertical Piping: MSS Type 52, spring hangers.
- G. Support horizontal piping within 12 inches of each fitting and coupling.
- H. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.
- I. Install supports for vertical, Schedule 40, steel piping every 15 feet.
- J. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1/4: 60 inches with 3/8-inch rod.
  - 2. NPS 3/8 and NPS 1/2: 72 inches with 3/8-inch rod.
  - 3. NPS 3/4: 84 inches with 3/8-inch rod.
  - 4. NPS 1: 96 inches with 3/8-inch rod.
  - 5. NPS 1-1/4: 108 inches with 3/8-inch rod.
  - 6. NPS 1-1/2: 10 feet with 3/8-inch rod.
  - 7. NPS 2: 11 feet with 3/8-inch rod.
- K. Install supports for vertical copper tubing every 10 feet.

### **3.10 LABELING AND IDENTIFICATION**

- A. Install identifying labels and devices for general-service compressed-air piping, valves, and specialties. Comply with requirements in Division 22 Section "Identification for Plumbing Piping and Equipment."

### **3.11 FIELD QUALITY CONTROL**

- A. Perform field tests and inspections.
- B. Tests and Inspections:
  - 1. Piping Leak Tests: Test new and modified parts of existing piping. Cap and fill general - service compressed-air piping with oil-free dry air or gaseous nitrogen to pressure of 50 psig above system operating pressure, but not less than 150 psig. Isolate test source and let stand for four hours to equalize temperature. Refill system, if required, to test pressure; hold for two hours with no drop in pressure.
  - 2. Repair leaks and retest until no leaks exist.
  - 3. Inspect filters, lubricators and pressure regulators for proper operation.

**END OF SECTION**

**SECTION 22 1519****GENERAL-SERVICE PACKAGED AIR COMPRESSORS AND RECEIVERS****PART 1 GENERAL****1.01 SUMMARY**

- A. Section Includes:
  - 1. Lubricated, reciprocating air compressors.
  - 2. Inlet-air filters.

**1.02 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Design compressed-air equipment mounting, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Seismic Performance: Compressed-air equipment shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
  - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

**1.03 SUBMITTALS**

- A. Product Data: For each type of product indicated.
  - 1. Wiring Diagrams: For power, signal, and control wiring.
- B. Delegated-Design Submittal: For compressed-air equipment mounting indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  - 1. Detail fabrication and assembly of supports.
  - 2. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
- C. Seismic Qualification Certificates: For compressed-air equipment, accessories, and components, from manufacturers.
- D. Operation and maintenance data.

**1.04 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ASME Compliance: Fabricate and label receivers to comply with ASME Boiler and Pressure Vessel Code.

**PART 2 PRODUCTS****2.01 GENERAL REQUIREMENTS FOR PACKAGED AIR COMPRESSORS AND RECEIVERS**

- A. General Description: Factory-assembled, -wired, -piped, and -tested; electric-motor-driven; air-cooled; continuous-duty air compressors and receivers that deliver air of quality equal to intake air.
- B. Control Panels: Automatic control station with load control and protection functions. Comply with NEMA ICS 2 and UL 508.
  - 1. Enclosure: NEMA ICS 6, Type 12 control panel unless otherwise indicated.
  - 2. Motor Controllers: Full-voltage, combination magnetic type with undervoltage release feature and motor-circuit-protector-type disconnecting means and short-circuit protective device.
  - 3. Control Voltage: 120-V ac or less, using integral control power transformer.
  - 4. Motor Overload Protection: Overload relay in each phase.
  - 5. Starting Devices: Hand-off-automatic selector switch in cover of control panel, plus pilot device for automatic control.

6. Automatic control switches to alternate lead-lag compressors for duplex air compressors.
  7. Instrumentation: Include discharge-air pressure gage, air-filter maintenance indicator, hour meter, compressor discharge-air and coolant temperature gages, and control transformer.
  8. Alarm Signal Device: For connection to alarm system to indicate when backup air compressor is operating.
- C. Receivers: Steel tank constructed according to ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
1. Pressure Rating: At least as high as highest discharge pressure of connected compressors, and bearing appropriate code symbols.
  2. Interior Finish: Corrosion-resistant coating.
  3. Accessories: Include safety valve, pressure gage, drain, and pressure-reducing valve.
- D. Mounting Frame: Fabricate mounting and attachment to pressure vessel with reinforcement strong enough to resist packaged equipment movement during a seismic event when base is anchored to building structure.

## 2.02 LUBRICATED, RECIPROCATING AIR COMPRESSORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Ingersoll-Rand; Air Solutions Group.
  2. Kaeser Compressors, Inc.
  3. Gardner Denver, Inc.
- B. Compressor(s): Lubricated, reciprocating-piston type with lubricated compression chamber and crankcase.
1. Submerged gear-type oil pump.
  2. Oil filter.
  3. Combined high discharge-air temperature and low lubrication-oil pressure switch.
  4. Belt guard totally enclosing pulleys and belts.
- C. Capacities and Characteristics:
1. Air Compressor(s): One; two stage.
    - a. Intercooler between stages of two-stage units.
  2. Discharge-Air Pressure: 100 psig
  3. Receiver: ASME construction steel tank.
    - a. Arrangement: Vertical.
    - b. Capacity: 80 gal.
    - c. Interior Finish: Epoxy or galvanized coating.
    - d. Pressure Rating: 100 psig minimum.
    - e. Drain: Automatic valve.

## 2.03 INLET-AIR FILTERS

- A. Description: Combination inlet-air filter-silencer, suitable for remote installation, for each air compressor.
1. Construction: Weatherproof housing for replaceable, dry-type filter element, with silencer tubes or other method of sound reduction.
  2. Capacity: Match capacity of air compressor, with filter having collection efficiency of 99 percent retention of particles larger than 10 micrometers.
- B. Description: Combination inlet-air filter-silencer, suitable for remote installation, for multiple air compressors.
1. Construction: Weatherproof housing for replaceable, dry-type filter element, with silencer tubes or other method of sound reduction.
  2. Capacity: Match total capacity of connected air compressors, with filter having collection efficiency of 99 percent retention of particles larger than 10 micrometers.

## 2.04 MOTORS

- A. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors.
  - 1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
  - 2. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Division 26 Sections.

## PART 3 EXECUTION

### 3.01 EQUIPMENT INSTALLATION

- A. Equipment Mounting: Install air compressors, aftercoolers, and air dryers on concrete bases using elastomeric pads. Comply with requirements in Division 03 Section "Cast-in-Place Concrete." Comply with requirements for vibration isolation devices specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
  - 1. Minimum Deflection: 1/4 inch.
- B. Equipment Mounting: Install air compressors, aftercoolers, and air dryers using elastomeric pads. Comply with requirements for vibration isolation devices specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
  - 1. Minimum Deflection: 1/4 inch.
- C. Equipment Mounting: Install air compressors, aftercoolers, and air dryers on vibration isolation inertia bases. Comply with requirements specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- D. Equipment Mounting: Install air compressors, aftercoolers, and air dryers on concrete bases. Comply with requirements in Division 03 Section "Cast-in-Place Concrete."
- E. Install compressed-air equipment anchored to substrate.
- F. Install the following devices on compressed-air equipment:
  - 1. Thermometer, Pressure Gage, and Safety Valve: Install on each compressed-air receiver.
  - 2. Pressure Regulators: Install downstream from air compressors and dryers.
  - 3. Automatic Drain Valves: Install on receivers. Discharge condensate over nearest floor drain.
- G. Engage a factory-authorized service representative to perform startup service.
  - 1. Complete installation and startup checks according to manufacturer's written instructions.
  - 2. Check for lubricating oil in lubricated-type equipment.
  - 3. Check belt drives for proper tension.
  - 4. Verify that air-compressor inlet filters and piping are clear.
  - 5. Check for equipment vibration-control supports and flexible pipe connectors and verify that equipment is properly attached to substrate.
  - 6. Check safety valves for correct settings. Ensure that settings are higher than air-compressor discharge pressure but not higher than rating of system components.
  - 7. Check for proper seismic restraints.
  - 8. Drain receiver tanks.
  - 9. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
  - 10. Test and adjust controls and safeties.

### 3.02 CONNECTIONS

- A. Comply with requirements for piping specified in Division 22 Section "General-Service Compressed-Air Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to machine to allow service and maintenance.



**3.03 IDENTIFICATION**

- A. Identify general-service air compressors and components. Comply with requirements for identification specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

**3.04 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain air compressors, aftercoolers, and air dryers.

**END OF SECTION**

**SECTION 22 3400**  
**FUEL-FIRED, DOMESTIC-WATER HEATERS**

**PART 1 GENERAL****1.01 SUMMARY**

- A. Section Includes:
  - 1. Commercial, power-burner, gas-fired, storage, domestic-water heaters.
  - 2. Domestic-water heater accessories.

**1.02 PERFORMANCE REQUIREMENTS**

- A. Seismic Performance: Commercial domestic-water heaters shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
  - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

**1.03 SUBMITTALS**

- A. Product Data: For each type and size of domestic-water heater indicated.
- B. Shop Drawings:
  - 1. Wiring Diagrams: For power, signal, and control wiring.
- C. Seismic Qualification Certificates: For fuel-fired, domestic-water heaters, accessories, and components, from manufacturer.
- D. Product certificates.
- E. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.
- F. Source quality-control reports.
- G. Field quality-control reports.
- H. Operation and maintenance data.
- I. Warranty: Sample of special warranty.

**1.04 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ASHRAE/IESNA 90.1 Compliance: Fabricate and label fuel-fired, domestic-water heaters to comply with ASHRAE/IESNA 90.1.
- C. ASME Compliance:
  - 1. Where ASME-code construction is indicated, fabricate and label commercial, domestic-water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
  - 2. Where ASME-code construction is indicated, fabricate and label commercial, finned-tube, domestic-water heaters to comply with ASME Boiler and Pressure Vessel Code: Section IV.
- D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61, "Drinking Water System Components - Health Effects."

**1.05 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of fuel-fired, domestic-water heaters that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Periods: From date of Substantial Completion.
    - a. Commercial, Gas-Fired, Storage, Domestic-Water Heaters:
      - 1) Storage Tank: Five years.

- 2) Controls and Other Components: One year(s).
- b. Compression Tanks: Five years.

## **PART 2 PRODUCTS**

### **2.01 COMMERCIAL, GAS-FIRED, STORAGE, DOMESTIC-WATER HEATERS**

- A. Commercial, Atmospheric, Gas-Fired, Storage, Domestic-Water Heaters:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Bradford White Corporation.
    - b. Lochinvar Corporation.
    - c. Smith, A. O. Water Products Co.; a division of A. O. Smith Corporation.
  2. Standard: ANSI Z21.10.3/CSA 4.3.
  3. Storage-Tank Construction: ASME-code steel with 150-psig working-pressure rating.
    - a. Tappings: Factory fabricated of materials compatible with tank. Attach tappings to tank before testing.
      - 1) NPS 2 and Smaller: Threaded ends according to ASME B1.20.1.
      - 2) NPS 2-1/2 and Larger: Flanged ends according to ASME B16.5 for steel and stainless-steel flanges, and according to ASME B16.24 for copper and copper-alloy flanges.
    - b. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
    - c. Lining: Glass complying with NSF 61 barrier materials for potable-water tank linings, including extending lining into and through tank fittings and outlets.
  4. Factory-Installed Storage-Tank Appurtenances:
    - a. Anode Rod: Replaceable magnesium.
    - b. Dip Tube: Required unless cold-water inlet is near bottom of tank.
    - c. Drain Valve: Corrosion-resistant metal complying with ASSE 1005.
    - d. Insulation: Comply with ASHRAE/IESNA 90.1. Surround entire storage tank except connections and controls.
    - e. Jacket: Steel with enameled finish.
    - f. Burner: For use with atmospheric, gas-fired, domestic-water heaters and natural-gas fuel.
    - g. Automatic Ignition: ANSI Z21.20/CSA C22.2 No. 199, electric, automatic, gas-ignition system.
    - h. Temperature Control: Adjustable thermostat.
    - i. Safety Controls: Automatic, high-temperature-limit and low-water cutoff devices or systems.
    - j. Combination Temperature-and-Pressure Relief Valves: ANSI Z21.22/CSA 4.4-M. Include one or more relief valves with total relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select one relief valve with sensing element that extends into storage tank.
  5. Special Requirements: NSF 5 construction.
  6. Manufacturer's concentric vent kit.
  7. Automatic Damper: ANSI Z21.66/CSA 6.14-M, electrically operated, automatic-vent-damper device with size matching draft hood.

### **2.02 DOMESTIC-WATER HEATER ACCESSORIES**

- A. Domestic-Water Compression Tanks:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. AMTROL Inc.
    - b. Flexcon Industries.
    - c. Honeywell International Inc.
    - d. Pentair Pump Group (The); Myers.
    - e. Smith, A. O. Water Products Co.; a division of A. O. Smith Corporation.

- f. Taco, Inc.
- 2. Description: Steel, pressure-rated tank constructed with welded joints and factory-installed butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
- 3. Construction:
  - a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
  - b. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
  - c. Air-Charging Valve: Factory installed.
- 4. Capacity and Characteristics:
  - a. Working-Pressure Rating: 100 psig.
  - b. Capacity Acceptable: 2 gal. minimum.
- B. Drain Pans: Corrosion-resistant metal with raised edge. Comply with ANSI/CSA LC 3. Include dimensions not less than base of domestic-water heater, and include drain outlet not less than NPS 3/4 with ASME B1.20.1 pipe threads or with ASME B1.20.7 garden-hose threads.
- C. Piping-Type Heat Traps: Field-fabricated piping arrangement according to ASHRAE/IESNA 90.1 or ASHRAE 90.2.
- D. Heat-Trap Fittings: ASHRAE 90.2.
- E. Gas Shutoff Valves: ANSI Z21.15/CSA 9.1-M, manually operated. Furnish for installation in piping.
- F. Gas Pressure Regulators: ANSI Z21.18/CSA 6.3, appliance type. Include 1/2-psig pressure rating as required to match gas supply.
- G. Automatic Gas Valves: ANSI Z21.21/CSA 6.5, appliance, electrically operated, on-off automatic valve.
- H. Combination Temperature-and-Pressure Relief Valves: Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valves with sensing element that extends into storage tank.
  - 1. Gas-Fired, Domestic-Water Heaters: ANSI Z21.22/CSA 4.4-M.
- I. Pressure Relief Valves: Include pressure setting less than domestic-water heater working-pressure rating.
  - 1. Gas-Fired, Domestic-Water Heaters: ANSI Z21.22/CSA 4.4-M.
- J. Vacuum Relief Valves: ANSI Z21.22/CSA 4.4-M.
- K. Domestic-Water Heater Stands: Manufacturer's factory-fabricated steel stand for floor mounting, capable of supporting domestic-water heater and water. Provide dimension that will support bottom of domestic-water heater a minimum of 18 inches above the floor.
- L. Domestic-Water Heater Mounting Brackets: Manufacturer's factory-fabricated steel bracket for wall mounting, capable of supporting domestic-water heater and water.

### 2.03 SOURCE QUALITY CONTROL

- A. Factory Tests: Test and inspect assembled domestic-water heaters and storage tanks specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.
- B. Hydrostatically test commercial domestic-water heaters and storage tanks to minimum of one and one-half times pressure rating before shipment.
- C. Domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Division 01 Section "Quality Control" for retesting and reinspecting requirements and Division 01 Section "Execution Requirements" for requirements for correcting the Work.
- D. Prepare test and inspection reports.

**PART 3 EXECUTION****3.01 DOMESTIC-WATER HEATER INSTALLATION**

- A. Commercial, Domestic-Water Heater Mounting: Install commercial domestic-water heaters on concrete base. Comply with requirements for concrete base specified in Division 03 Section "Cast-in-Place Concrete".
1. Exception: Omit concrete bases for commercial domestic-water heaters if installation on stand, bracket, suspended platform, or directly on floor is indicated.
  2. Maintain manufacturer's recommended clearances.
  3. Arrange units so controls and devices that require servicing are accessible.
  4. 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 concrete base.
  5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
  6. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  7. Install anchor bolts to elevations required for proper attachment to supported equipment.
  8. Anchor domestic-water heaters to substrate.
- B. Install domestic-water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.
1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in Division 22 Section "General-Duty Valves for Plumbing Piping."
- C. Install gas-fired, domestic-water heaters according to NFPA 54.
1. Install gas shutoff valves on gas supply piping to gas-fired, domestic-water heaters without shutoff valves.
  2. Install gas pressure regulators on gas supplies to gas-fired, domestic-water heaters without gas pressure regulators if gas pressure regulators are required to reduce gas pressure at burner.
  3. Install automatic gas valves on gas supplies to gas-fired, domestic-water heaters if required for operation of safety control.
  4. Comply with requirements for gas shutoff valves, gas pressure regulators, and automatic gas valves specified in Division 23 Section "Facility Natural-Gas Piping."
- D. Install commercial domestic-water heaters with seismic-restraint devices.
- E. Install combination temperature-and-pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.
- F. Install combination temperature-and-pressure relief valves in water piping for domestic-water heaters without storage. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.
- G. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for domestic-water heaters that do not have tank drains. Comply with requirements for hose-end drain valves specified in Division 22 Section "Domestic Water Piping Specialties."
- H. Install thermometer on outlet piping of domestic-water heaters.
- I. Install piping-type heat traps on inlet and outlet piping of domestic-water heater storage tanks without integral or fitting-type heat traps.
- J. Fill domestic-water heaters with water.
- K. Charge domestic-water compression tanks with air.

**3.02 CONNECTIONS**

- A. Comply with requirements for domestic-water piping specified in Division 22 Section "Domestic Water Piping."
- B. Comply with requirements for gas piping specified in Division 23 Section "Facility Natural-Gas Piping."
- C. Drawings indicate general arrangement of piping, fittings, and specialties.
- D. Where installing piping adjacent to fuel-fired, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

**3.03 IDENTIFICATION**

- A. Identify system components. Comply with requirements for identification specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

**3.04 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
  - 2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
  - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Division 01 Section "Quality Control" for retesting and reinspecting requirements and Division 01 Section "Execution Requirements" for requirements for correcting the Work.
- C. Prepare test and inspection reports.

**3.05 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain commercial, gas-fired, storage, domestic-water heaters.

**END OF SECTION**

**SECTION 22 4216.16  
COMMERCIAL SINKS**

**PART 1 GENERAL****1.01 SUMMARY**

- A. Section Includes:
  - 1. Utility sinks.
  - 2. Sink faucets.
  - 3. Supply fittings.
  - 4. Waste fittings.

**1.02 ACTION SUBMITTALS**

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

**1.03 INFORMATIONAL SUBMITTALS**

- A. Coordination Drawings: Counter cutout templates for mounting of counter-mounted lavatories.

**1.04 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

**PART 2 PRODUCTS****2.01 UTILITY SINKS**

- A. Service Sinks: Enameled, cast iron, floor mounted.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. CECO Sinks.
    - b. American Standard America.
    - c. Commercial Enameling Company.
    - d. Gerber Plumbing Fixtures LLC.
    - e. Kohler Co.
  - 2. Fixture:
    - a. Standard: ASME A112.19.1/CSA B45.2.
    - b. Style: With front apron and raised back.
    - c. Nominal Size: 28 by 28 inches.
    - d. Color: White.
    - e. Drain: Grid with NPS 3 outlet.
    - f. Rim Guard: Coated wire.

**2.02 SINK FAUCETS**

- A. NSF Standard: Com ply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for faucet-spout materials that will be in contact with potable water.
- B. Sink Faucets: Manual type, single-control mixing valve.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Chicago Faucets.
    - b. Elkay Manufacturing Co.
    - c. Just Manufacturing.
    - d. Moen Incorporated.
    - e. T & S Brass and Bronze Works, Inc.
    - f. Zurn Industries, LLC; Commercial Brass and Fixtures.
  - 2. Standard: ASME A112.18.1/CSA B125.1.
  - 3. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and sink receptor.
  - 4. Body Type: Centerset.
  - 5. Body Material: Commercial, solid brass.

6. Finish: Polished chrome plate
7. Maximum Flow Rate: 2.2 gpm.
8. Handle(s): Lever
9. Mounting Type: Deck, exposed.
10. Spout Outlet: Aerator.

### 2.03 SUPPLY FITTINGS

- A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.
- B. Standard: ASME A112.18.1/CSA B125.1.
- C. Supply Piping: Chrome-plated brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated brass or stainless-steel wall flange.
- D. Supply Stops: Chrome-plated brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.
- E. Operation: Loose key.
- F. Risers:
  1. NPS 1/2
  2. ASME A112.18.6, braided flexible hose.

### 2.04 WASTE FITTINGS

- A. Standard: ASME A112.18.2/CSA B125.2.
- B. Drain: Grid type with NPS 1-1/2 offset and straight tailpiece.
- C. Trap:
  1. Size: NPS 1-1/2.
  2. Material: Chrome-plated, two-piece, cast-brass trap and ground-joint swivel elbow with 0.032-inch-thick brass tube to wall; and chrome-plated brass or steel wall flange.
  3. Material: Stainless-steel, two-piece trap and swivel elbow with 0.012-inch-thick stainless-steel tube to wall; and stainless-steel wall flange.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before sink installation.
- B. Examine walls, floors, and counters for suitable conditions where sinks will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 INSTALLATION

- A. Install sinks level and plumb according to roughing-in drawings.
- B. Install supports, affixed to building substrate, for wall-hung sinks.
- C. Install accessible wall-mounted sinks at handicapped/elderly mounting height according to ICC/ANSI A117.1.
- D. Install water-supply piping with stop on each supply to each sink faucet.
  1. Exception: Use ball, gate, or globe valves if supply stops are not specified with sink. Comply with valve requirements specified in Division 22 Section "General-Duty Valves for Plumbing Piping."
  2. Install stops in locations where they can be easily reached for operation.
- E. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Division 22 Section "Escutcheons for Plumbing Piping."



- F. Seal joints between sinks and counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Division 07 Section "Joint Sealers."
- G. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible sinks. Comply with requirements in Division 22 Section "Plumbing Piping Insulation."

**3.03 CONNECTIONS**

- A. Connect sinks with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- B. Comply with water piping requirements specified in Division 22 Section "Domestic Water Piping."
- C. Comply with soil and waste piping requirements specified in Division 22 Section "Sanitary Waste and Vent Piping."

**3.04 ADJUSTING**

- A. Operate and adjust sinks and controls. Replace damaged and malfunctioning sinks, fittings, and controls.
- B. Adjust water pressure at faucets to produce proper flow.

**3.05 CLEANING AND PROTECTION**

- A. After completing installation of sinks, inspect and repair damaged finishes.
- B. Clean sinks, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.
- C. Provide protective covering for installed sinks and fittings.
- D. Do not allow use of sinks for temporary facilities unless approved in writing by Owner.

**END OF SECTION**

**SECTION 23 0000**  
**GENERAL MECHANICAL REQUIREMENTS**

**PART 1 GENERAL****1.01 GENERAL REQUIREMENTS**

- A. The General conditions, supplementary conditions, special Requirements, and applicable portions of Division 1 of the specification are a part of this Division and the requirements contained herein are supplementary to them.
- B. This Division is an integrated whole comprising interrelated and interdependent sections and shall be considered in its entirety in determining requirements.
- C. Refer to other sections of this Division for additional requirements or information regarding the subjects of this Section.

**1.02 ABBREVIATIONS AND DEFINITIONS (as used on Division 23 Drawings and herein)**

- A. This Division is abbreviated and includes incomplete sentences. Supply omitted words by inference.
- B. Symbols: "S" means submittals are required; "M/O" means Maintenance/Operating data is required; see paragraphs hereinafter.
- C. "Provide" means furnish, install and connect unless otherwise described in specific instances.
- D. "Piping" means pipes, fittings, valves and all like pipe accessories connected thereto.
- E. "Ductwork" means ducts, plenums, compartments, casings or any like devices, including the building structure, which are used to convey or contain air.
- F. "Extend", "Submit", "Repair", "Abandon", "Replace", "Remove" and similar words mean that the Contractor (or his designated subcontractor) shall accomplish the action described.
- G. "Codes" or "Code" means all codes, laws, statutes, rules, regulations, ordinances, orders, decrees, and other requirements of all legally constructed authorities and public utility franchise holders having jurisdiction.
- H. "Products", "Materials" and "Equipment" are used interchangeably and mean materials, fixtures, equipment, accessories, etc.
- I. "Utility Areas" are defined as mechanical, electrical, janitorial, and similar rooms or spaces which are normally used or occupied only by custodial or maintenance personnel. "Public Areas" are defined as the rooms or spaces which are not included in the utility areas definition.
- J. "Building Boundary" includes concrete walkways immediately adjacent to the building structure.
- K. "Below Grade" means buried in the ground.
- L. "Substantial Mechanical Completion" means all components of all systems are functioning but lacking in final adjustment.
- M. Pressure rating specified (such as for valves and the like) means design working pressure for and with references to the fluid which the device will serve.

**1.03 DESCRIPTION**

- A. Provide a complete and operable installation, including all labor, supervision, materials, equipment, tools, apparatus, transportation, warehousing, rigging, scaffolding and other equipment and services necessary to accomplish the work in accordance with the intent and meaning of these drawings and specifications.

**1.04 RELATED WORK**

- A. Coordination: Refer to Architectural, Civil, Structural, and Electrical Drawings for the construction details and coordinate the work of this Division with that of other Divisions. Order the work of this Division so that progress will harmonize with that of other Divisions and all work will proceed expeditiously. The work of this Division shall include direct responsibility for the correct placing and connection of mechanical work in relation to the work of other Divisions.

- B. Examine other Divisions for work related to the work of this Division especially Division 26 - ELECTRICAL.

#### **1.05 DRAWINGS AND SPECIFICATIONS**

- A. Drawings and specifications are intended to complement each other. Where a conflict exists between the requirements of the drawings and/or the specifications, request clarification.
- B. The Architect shall interpret the drawings and the specifications, and his decision as to the true intent and meaning thereof and the quality, quantity, and sufficiency of the materials and workmanship furnished there under shall be accepted as final and conclusive.
- C. In case of conflict not clarified prior to Bidding deadline, use the most costly alternative (better quality, greater quantity, or larger size) in preparing the Bid. A clarification will be issued to the successful bidder as soon as feasible after the Award and if appropriate a deductive change order will be issued.
- D. All provisions shall be deemed mandatory except as expressly indicated as optional by the word "may" or "option".

#### **1.06 PERMITS AND INSPECTIONS**

- A. Obtain, schedule and pay for permits, licenses, approvals, tests, and inspections required by legally constituted authorities and public utility franchise holders having jurisdiction over the work.
- B. Afford the Architect's representative every facility for evaluating the skill and competence of the mechanics and to examine the materials. Concealed work shall be reopened when so directed during his periodic visits.

#### **1.07 CODES AND REGULATIONS**

- A. By submitting a bid, Contractor is deemed to represent himself as competent to accomplish the work of this Division in conformance with applicable Codes. In case of conflict between the Contract documents and the Code requirements, the Codes shall take precedence. Should such conflicts appear, cease work on the parts of the contract affected and immediately notify the Architect in writing. It shall be the Contractor's responsibility to correct, at no cost to the Owner, any work he executes in violation of Code requirements. Specify references to codes elsewhere in this Division are either to aid the Contractor in locating applicable information or to deny him permission to use options which are permitted by Codes.
- B. Applicable Codes: (Current editions unless otherwise noted)
  - 1. All local codes; city and/or County as applicable
  - 2. OSHA requirements
  - 3. California Building Code
  - 4. California Mechanical Code
  - 5. California Plumbing Code
  - 6. California Code of Regulations (CCR) Titles
  - 7. Fire Marshal Regulations
  - 8. Regulations of all other authorities having jurisdiction.
- C. Where conflict or variation exists among codes, the most stringent shall govern.
- D. Certificates of Conformance or Compliance: Submit original and not pre-printed certifications. Do not make statements in the certifications that could be interpreted to imply that the product does not meet all requirements specified, such as "as good as", "achieve the same end use and results as materials formulated in accordance with the referenced publications", "equal or exceed the services and performance of the specified material". Simply state that the product conforms to the requirements specified.
- E. Certified Test Reports: Certified Test Reports are reports of tests conducted on previously manufactured materials or equipment identical to that proposed for use. Before delivery of materials and equipment, submit certified copies of test reports specified in the individual sections.

- F. Factory Tests: Factory tests are tests which are required to be performed on the actual materials or equipment proposed for use. Submit results of the tests in accordance with the requirements for laboratory test results of this Contract.
- G. Permits and Certificates of Inspection: Furnish the originals.
- H. Testing procedures and test results required in this and other sections. Furnish 2 copies.
- I. Other data required by other sections of this Division. Furnish 2 copies.

#### 1.08 RECORD AND DOCUMENTATION

- A. Accumulate the following and deliver to the Owner's representative prior to final acceptance of the work:

- 1. Record (As-Built) Drawings:

- a. Maintain in good order in the field office a complete set of prints for all work being done under Division 23. Update the drawings daily with neat and legible annotations in red ink showing the work as actually installed.
- b. The actual size, location and elevation of all buried lines, valve boxes, manholes, monuments, and stub-outs shall be accurately located and dimensioned from building walls or other permanent landmarks.
- c. Furnish the originals.

- 2. Operation and Maintenance Manual: Furnish an operation and maintenance manual covering the stipulated mechanical systems and equipment. Seven copies of the manual, bound in hardback binders or an approved equivalent, shall be provided to the Architect in accordance with the Division 1 section on Maintenance and Operation Manuals. Furnish one complete manual prior to the time that system or equipment tests are performed. Furnish the remaining manuals before the contract is completed. The following identification shall be inscribed on the cover:

OPERATION AND MAINTENANCE MANUAL

PROJECT TITLE.....

CONTRACTOR.....

Provide a table of contents. Insert tab sheets to identify discrete subjects. Instruction sheets shall be legible and easily understood, with large sheets of drawings folded in. The manual shall be complete in all respects for all materials, piping, valves, devices and equipment, controls, accessories and appurtenances stipulated. Include as a minimum the following:

- a. Updated approved materials list, shop drawings and catalog information of all items indicated by symbol "M/O" at titles or beginning of paragraphs.
- b. System layout showing piping, valves and controls.
- c. Wiring and control diagrams with data to explain detailed operation and control of each component.
- d. A control sequence describing start-up, operation and shutdown.
- e. Detailed description of the function of each principal component of the system.
- f. Procedure for starting.
- g. Procedure for operation.
- h. Shut-down instruction.
- i. Installation instructions.
- j. Adjustments, maintenance and overhaul instructions.
- k. Lubrication schedule including type, grade, temperature range and frequency.
- l. Safety precautions, diagrams and illustrations.
- m. Test procedures.
- n. Performance data.
- o. Parts lists, with manufacturer's names and catalog numbers.
- p. Preventive maintenance schedule.
- q. Service organization with name, address and telephone number.
- r. Valve identification chart and schedule.
- s. ASME certification

- t. Air Balance report.
- B. Standard Compliance: Where equipment or materials are specified to conform with requirements of standards of recognized technical or industrial organizations such as American National Standards (ANSI), American Society of Mechanical Engineers (ASME), American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), Underwriters Laboratories (UL), American Refrigeration Institute (ARI), American Gas Association (AGA), or National Electrical Manufacturer's Association (NEMA), that use a label or published listing as a method of indicating compliance, proof of such conformance shall be submitted and approved. The label or listing of the specified organization will be acceptable evidence.
- C. Certificates of Conformance or Compliance: Submit original and not pre-printed certifications. Do not make statements in the certifications that could be interpreted to imply that the product does not meet all requirements specified, such as "as good as", "achieve the same end use and results as materials formulated in accordance with the referenced publications", "equal or exceed the services and performance of the specified material". Simply state that the product conforms to the requirements specified.
- D. Certified Test Reports: Certified Test Reports are reports of tests conducted on previously manufactured materials or equipment identical to that proposed for use. Before delivery of materials and equipment, submit certified copies of test reports specified in the individual sections.
- E. Factory Tests: Factory tests are tests which are required to be performed on the actual materials or equipment proposed for use. Submit results of the tests in accordance with the requirements for laboratory test results of this Contract.
- F. Permits and Certificates of Inspection: Furnish the originals.
- G. Testing procedures and test results required in this and other sections. Furnish 2 copies.
- H. Other data required by other sections of this Division. Furnish 2 copies.

#### **1.09 TOOLS**

- A. Provide all special tools needed for proper operation and routine adjustment and maintenance of systems and equipment. Deliver tools to Owner's representative and request a receipt for same.

#### **1.10 CONSTRUCTION COST BREAKDOWN**

- A. To assist the Architect and Engineer in evaluation of the construction cost, the Contractor shall prepare and submit for review a construction cost breakdown for the major subdivisions of the mechanical work.
- B. Subdivide each item on the breakdown into two headings: labor and materials. Include overhead and profit in each entry.
- C. Cost breakdowns shall be submitted and approved prior to the first payment request. Send one copy of the breakdown directly to the Engineer and the remaining copies sent through regular channels.

### **PART 2 PRODUCTS**

#### **2.01 MATERIALS AND EQUIPMENT**

- A. Standard Products: Materials and equipment shall be essentially the standard cataloged products of manufacturers regularly engaged in production of such materials or equipment and shall be their latest standard designs that comply with the specification requirements. Materials and equipment shall duplicate items that have been in satisfactory commercial or industrial use at least two years prior to bid opening. Where two or more units of the same type of equipment are required, these units shall be products of a single manufacturer. The components thereof, however, are not required to be exclusively of the same manufacturer. Each major component of equipment shall have manufacturer's name, address, model, and serial number on a nameplate securely affixed in a conspicuous place. The nameplate of the distributing agent will

not be acceptable.

- B. Whenever on the plans, or in these specifications, products are identified by the name of one manufacturer, it is intended that equivalent products of other manufacturers are acceptable, unless otherwise indicated, if accepted as a substitution by the Architect. Where three or more manufacturers are listed as "acceptable manufacturers" however, then the products furnished shall be the product of one of the manufacturers listed. Manufacturers listed as "acceptable manufacturers" shall meet quality and performance of a particular one specified by both name and catalog number.

**2.02 SUBSTITUTIONS**

- A. General: Should the Contractor desire to substitute for specified products, he shall submit with the Material List a complete list of the requested substitutions. The request shall contain complete descriptive information of the products. Samples for evaluation shall also be submitted upon the Architect's request. If in the Architect's opinion the products as presented in this first submittal are in variance with the specified products, or if the information submitted is not sufficiently complete to allow proper evaluation, the substitution will be disallowed from consideration and the specified products shall be furnished. By proposing a substitution, it is deemed that the Contractor shall bear the cost of any changes (whether architectural, structural, electrical or mechanical) necessary to accommodate the substitution.
- B. Specific: Refer to other sections of this Division for additional requirements.

**2.03 SUBMITTALS**

- A. General:
  1. Provide for all items indicated with the symbol "S" at titles or beginning of paragraphs in accordance with the Division 1 section covering submittals and as herein specified. Where warranty of longer than one year is specified, include such warranty with submittal. Architect's review of the submittal is only for general conformance with design compliance with the information given in the contract documents. The submittal procedure is required as an effort to minimize the problems which occur due to the discovery of Contractor non-compliance at the construction site. The Contractor is responsible for conformation and correlation of the dimensions, quantities and sizes, for information that pertains to fabrication methods or construction techniques, and for coordination of work of all Divisions of the work. Deviations, if any, from Contract documents shall be clearly and completely indicated (by a separate letter if deviations are extensive) in the submittals, and the lack of such is deemed complete compliance with Contract Documents without any deviations. Submittals favorably processed will not relieve the Contractor of responsibility for deviations not so reported nor for errors in the submittal.
  2. In addition to the above, upon permission to proceed after review of submittal and prior to the installation of work, submit dimensioned and scaled drawings (not less than 1/4-inch equal to one foot) of all mechanical equipment rooms and areas. Such layouts shall indicate, but not be limited to, all mechanical equipment, control panels, piping, housekeeping pads, ductwork, tube pull, access and maintenance clearances, and other like items. The layout shall also indicate major equipment to be provided under other Sections of work.
  3. Contractor Stamp: All submittals shall be stamped with the following text and signed by the Contractors representative:  
 "IT IS HEREBY CERTIFIED THAT THE PRODUCTS SHOWN AND MARKED IN THIS SUBMITTAL ARE IN COMPLIANCE WITH THE CONTRACT DOCUMENTS AND CAN BE INSTALLED IN THE ALLOCATED SPACES EXCEPT WHERE NOTED AS DEVIATIONS.  
 CERTIFIED BY:----- DATE:-----
  4. All submittals shall be complete and with catalog data and information properly marked to show, among other things, equality of material (where substitution is allowed and desired), adequacy in capacity and performance to meet minimum capacities of performance as specified or indicated. Arrange the submittals in the same sequence as the specifications, and reference (at the upper right-hand corner) the particular specification

- provision for which each submittal is intended. Incomplete submittals will be rejected.
5. For all work under Division 23, the notations by the Contractor or Supplier on submittal documents "Per Plans and Specifications", or "As Specified", or similar wording or phrasing is not acceptable and will be cause of rejection. Complete descriptive submittals are required for all Division 23 work.
  6. Refer to the other sections of this Division for specific requirements.
- B. **Material List:** Within 15 days after award of Contract, submit for approval a complete list of materials proposed for use. Furnish names and addresses of manufacturers, catalog numbers (where applicable) types and trade names. For purposes of uniformity, only one manufacturer will be accepted for each class or type of material. This list is in addition to Shop Drawings.
  - C. **Shop Drawings:** Submit shop drawings with such promptness as to cause no delay in the work. Do not commence fabrication of the equipment until the approved drawings are received from the Owner's representative.
  - D. **Other Submittals:** As required by other sections of this Division.

### **PART 3 EXECUTION**

#### **3.01 WORKMANSHIP AND INSTALLATION METHODS**

- A. Workmanship shall be in the best standard practice of the trade.
- B. Execute the work so as to contribute to ease of operation and maintenance, maximum accessibility and best appearance. Execute it so that the installation will conform and adjust itself to the building structure, its equipment and its usage. The work shall be symmetrical, plumb, uniform, properly aligned, and firmly secured in place.
- C. Install equipment in accordance with the manufacturer's instructions and recommendations unless otherwise noted or specified.

#### **3.02 TESTS**

- A. **General:**
  1. Demonstrate that all components of the work of this Division have been provided and that they operate in accordance with the Contract Documents.
  2. Provide instruments and personnel for tests and demonstrations. Submit signed test results.
- B. **Specific:** Refer to the other sections of this Division for test requirements.

#### **3.03 DELIVERY, HANDLING, STORAGE OF MATERIALS AND PROTECTION OF WORK**

- A. Protect materials against dirt, water, chemical and mechanical damage both while in storage and during construction.
- B. Cover materials in such a manner that no finished surfaces will be damaged, marred or splattered with plaster or paint and all moving parts will be kept clean and dry.
- C. Replace or refinish any damaged materials including fronts of control panels, ductwork fittings, and shop fabricated ductwork.
- D. Keep cabinets and other openings closed to prevent entry of foreign matter.

#### **3.04 CLEANUP AND HOUSEKEEPING**

- A. Cleaning shall be done as the work proceeds. Periodically remove waste and debris to keep the site as clean as is practical.
- B. Leave exposed parts of the mechanical work in a neat, clean and usable condition, with painted surfaces unblemished and plated metal surfaces polished.

#### **3.05 PROJECT CONDITIONS**

- A. **Site Examinations and Conditions:**
  1. Regard information relative to existing conditions, services and structure as approximate only. Verify dimensions and locations, and be knowledgeable of all working conditions before submitting Bid. Verify pressure, location, size, and elevation of existing services (to

- which points of connection are to be made or crossed) as soon as possible and prior to commencement of any new work.
2. Make minor deviations necessary to conform to actual locations and conditions. Submission of Bid presumes proper examination of Site, locations, dimensions and conditions, and no additional cost will be honored for lack of such examinations.
- B. Existing Services: Examine the Contract Drawings and visit the project site to ascertain the extent of the existing services. Where existing equipment/services serving existing structures and/or existing structures to be demolished are to remain in service, reroute, relocate, or extend such existing equipment and/or services to accommodate this project without additional cost.
- C. Interruption of Existing Services: Where it is necessary to reroute existing services or utilities, or to make connections of new work to existing services or utilities, give timely written notice of such intent to the Owner and secure written approval before proceeding. Make all such interruptions at such time as permitted by the Owner. Anticipate such interruptions to be made outside of normal working hours or normal working days; therefore, no additional cost will be permitted for such work. Except in a case of emergency involving life, limb or health, do not operate any existing equipment (including valves). Where such operations are necessary, they shall be performed by the Owner's personnel.
- D. Access and Placement of Work:
1. Check and coordinate for clearance, accessibility and placement of equipment either by going through openings provided or by placing equipment during construction. Ordering of equipment to be shipped disassembled, or disassembly of equipment at Project Site and re-assembly of equipment to accomplish this requirement shall be executed without additional cost. Where provided openings are inadequate to accommodate equipment, provide new openings and restoration of same, all at no additional cost. Obtain written approval for new openings before proceeding.
  2. Verify location of all plumbing fixtures and equipment within finished spaces with the Architectural Drawings. In the event that Mechanical Drawings do not indicate exact locations, or are in conflict with the Architectural Drawings, obtain information regarding proper locations. Installation of work without proper instruction under such circumstances will result in relocation of work, when directed, without additional cost.
- E. Verification and Coordination: Drawings indicating suggested distribution routes are diagrammatic only, and all scaled and figured dimensions are approximate and are indicated for estimating purposes only. The Drawings do not indicate necessary offsets and like items. Do not construe Contract Drawings as fabrication drawings. Prior to fabrication and installation of work, verify all dimensions, sizes and distribution routes with actual conditions, and prepare submittal and fabrication drawings. Coordinate to avoid possible conflicts and resolve same where such exist. Install work to conform to structure, avoid obstruction, preserve headroom, and keep openings and passageway clear. Changes necessary, resulting from such verification and coordination, shall not be a cause for additional cost.
- F. See Drawings for extent of demolition.

### 3.06 WARRANTY

- A. Guarantee, in writing, all work against fault of any product or workmanship for a period of not less than one year after formal acceptance by the Owner; except, where longer periods are specified in the Specifications, such longer periods shall govern. However, when any component fails at any time during this period, the warranty period for such component and all other components that are inactive because of said failure shall be suspended. The warranty period for such component shall resume running for the remaining portion of the warranty period when failed component is completely repaired and in operation; however, in no case shall the resumed portion of the warranty period be less than 3 months in duration.
- B. Neither payments for work, nor total or partial occupancy of work by the Owner, within or prior to the warranty period specified, shall be construed as acceptance of faulty work or shall condone any negligence or omission of Contractor in doing the work.

### 3.07 SAFETY REQUIREMENTS



- A. Enclose and guard belts, pulleys, chains, gears, couplings, projecting setscrews, keys and other rotating parts in accordance with the OSHA 1910.219. Insulate, guard, and cover any high-temperature equipment and piping so located as to endanger personnel or create a fire hazard.

**3.08 MANUFACTURER'S RECOMMENDATIONS**

- A. Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material or equipment being installed, furnish printed copies of these recommendations to the installing Contractor and Architect prior to installation. Do not proceed with the installation of the item until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

**END OF SECTION**

**SECTION 23 0500**  
**BASIC MECHANICAL MATERIALS AND METHODS**

**PART 1 GENERAL****1.01 GENERAL REQUIREMENTS**

- A. The contract documents shall apply in their entirety to the work specified herein.
- B. Submittals: Submit shop drawings and manufacturer's data on each item marked [S] in accordance with the Division 1 section on submittals and Section 23 0000, Basic Mechanical Requirements.
- C. Maintenance and Operation Manuals: Provide manufacturer's maintenance and operation manuals on each item marked [M/O] in accordance with the Division 1 section on maintenance and operation manuals and Section 23 0000, Basic Mechanical Requirements.

**PART 2 PRODUCTS****2.01 ELECTRICAL MOTORS [S] [M/O]**

- A. Provide all motors indicated on drawings necessary for equipment under the Mechanical Work. See electrical drawings for voltage and phase of electrical services.
- B. Unless otherwise specified, all motors 1/2 HP or larger: heavy duty, ball bearing, squirrel cage induction type in drip proof or splash proof enclosure, 1.15 service factor, and shall be suitable for the voltage system specified or indicated. Motor speed shall not exceed 1750 rpm unless otherwise indicated or specified. Motors exposed outdoors: either epoxy encapsulated winding or TEFC enclosure.
- C. Each motor shall have sufficient starting torque to start the apparatus driven.
- D. Provide all motors with junction boxes or terminal boxes and provide adjustable slide rails for all motors with belt drives. All motors shall have a nameplate voltage rating of the specified operating voltage.
- E. Provide overload protection on single phase motors.
- F. Motors rated 1 HP and larger shall have shaft, bearings, and etc. capable of operating with multiple grooved sheaves and two or more belts.
- G. Provide with nameplates permanently attached to exterior housing with manufacturer's name and all electrical characteristics specified thereon.
- H. Brake horsepower shall not exceed 90% of rated motor horsepower.
- I. Motors shall be Lincoln, Westinghouse, General Electric, or approved equivalent.

**2.02 MOTOR STARTERS [S] [M/O]**

- A. See Electrical Drawings for voltage and phase of electrical services.
- B. Starters for motors will be provided under Division 26. Provide to Division 26 the data necessary for motor starter heater sizing for all motors.
- C. Enclosure: NEMA 1 (unless location of starters dictates otherwise) of sufficient size to contain all accessories specified.

**2.03 BELT DRIVES [S] [M/O]**

- A. V Type. Drives requiring not more than 2 belts: variable pitch type; size for mid-point of operating range. Drives requiring 3 or more belts: nonadjustable constant speed type. Provide belts in matched sets.
- B. All belt drives shall have a minimum rating of 1.5 times the motor nameplate horsepower rating.

**2.04 BELT AND DRIVE GUARDS [S]**

- A. Provide all rotating equipment drives and couplings with suitable guards.
- B. Drive guards shall be as standard by the equipment manufacturer.
- C. Belt guards shall be as standard by the equipment manufacturer.

**2.05 EQUIPMENT IDENTIFICATION [S]**

- A. General: Identify all equipment using brass discs or laminated plastics. Install as specified below in readily visible locations not interfering with insulation or equipment operation.
1. Brass Discs: Provide minimum 0.040-inch in thickness and 2-inches in diameter or square. Top line of each tag shall have 1/4-inch high black filled letters to indicate designation of service. Bottom line shall have 7/16-inch high black filled numbers to indicate equipment or valve number.
  2. Laminated Plastic: Provide white on black with engraved black letters. The equipment identifying name and number lettering size shall be a minimum of 1/4-inch in height, nameplate data 3/16-inch in height and the manufacturer's name and location 1/8-inch in height. Provide laminated plastic tags either 2-1/2-inches by 3-1/2-inches or 3-1/2-inches by 5-inches, as required.

**2.06 PRIMERS AND PAINTS [S]**

- A. All equipment furnished under Division 15, unless otherwise noted, shall be furnished with a factory applied prime coat.
- B. Where field priming or touch-up priming is required, primer shall be as follows for ferrous metal surfaces:
1. Metal Surfaces, Not Galvanized: Latex, corrosion resistant primer suitable for metal surfaces or Epoxy-polyamide, green primer paint, formula 150, type I (QPL).
  2. Metal Surfaces, Galvanized: Galvanized repair compound with high zinc dust content; ZRC Cold Galvanizing Compound, or approved equivalent (no known equivalent).
- C. Finish painting of Mechanical equipment furnished under Division 15: See Section 09 9000 - Paints and Coatings.
1. Non-metallic surfaces: Latex (Acrylic Emulsion, Exterior Wood and Masonry) Paint.

**2.07 SEALANTS [S]**

- A. Non-fireproof Penetrations: Silicone rubber sealant; DowCorning 785/4, or approved equivalent.
- B. Fireproof Penetrations: Sealant shall comply with ASTM-E-814 (UL 1479 or UL 94); 3M Brand Fire Barrier Penetration Sealing System with CP-25 caulk, or approved equivalent.

**2.08 SEALANTS, WATERSTOP**

- A. Cold applied, pre-formed, plasticized, waterstop sealing compound consisting of blends of refined hydrocarbon resins and plasticizing compounds; Synko-Flex Waterstop and Primer, or approved equivalent (no known equivalent).

**2.09 BOLTED MECHANICAL SEALS [S]**

- A. Seals shall be modular, bolted, mechanical link type, consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and wall opening. Links shall be loosely assembled with bolts to form a continuous rubber belt around the pipe with a pressure plate under each bolt head and nut. Tightening of the bolts shall cause the rubber sealing elements to expand to form a water-tight seal between the pipe and the sleeve; Thunderline "Link-Seal" Model LS, or approved equivalent.

**PART 3 EXECUTION****3.01 GENERAL**

- A. Install products in accordance with product manufacturer's recommendations. After installation of systems and until formal acceptance of systems by the Owner, be responsible for operation and maintenance of systems.

**3.02 ELECTRICAL WORK**

- A. Coordinate with Division 26. See Division 26 Contract Documents for voltage and phase of electrical services.
- B. All power wiring and conduits for same serving motors, and where indicated on Division 26

Contract Drawings, to mechanical control panels, separate or equipment mounted, shall be provided under Division 26.

- C. The following shall be provided under Division 23:
  - 1. Pre-wired mechanical control panels.
  - 2. All automatic or temperature control and interlock wiring, regardless of voltage, and conduits for same necessary for proper operation of equipment under Division 23. This includes interlock wiring between motor starter coils, interlocking relays, contactors, mechanical equipment control panels, temperature control devices, and temperature control panels.
  - 3. Power wiring and conduits for same not indicated on the Division 26 Contract Drawings to mechanical control panels (separate or equipment mounted).
- D. Install all wiring under Division 23 in rigid conduit or electrical metallic tubing indoors and in rigid conduit outdoors. All such wiring shall be concealed.

### 3.03 BELT DRIVES

- A. Select drives for proper speed required for conditions indicated. Conditions indicated are estimated conditions and may vary under actual operating conditions. To adjust speed for actual operating conditions, change drive as often as necessary, at no additional cost.

### 3.04 FLASHING

- A. Flash and counter flash with metal to make waterproof all penetrations through roofs or exterior walls. Roof flashing shall have a minimum 8-inch skirt. The metal flashing and counterflashing shall be the same material as the equipment to which they are attached. Factory-fabricated flashing may be used for piping. Prior to any interior finish work, test the integrity of all flashing with water hose.

### 3.05 EQUIPMENT INSTALLATION

- A. Install equipment where shown, as indicated, and in accordance with the manufacturer's recommendations for the specific service.
- B. Provide anchor bolts, setting Drawings and templates for setting equipment.
- C. Assure correct alignment of equipment after setting.
- D. Where grouting is necessary, use non-shrink type.
- E. Before bolting any equipment coat threads with an anti-seize and lubricating compound. Do not use powder driven anchors unless written permission has been obtained from the Architect.
- F. Provide all exposed moving or rotating parts of machines with guards in compliance with OSHA requirements. Install all guards in removable sections, if necessary, and with studs and wing nuts for removal of same in maintenance. Make provision for RPM readings on guards covering end of shafts; enclose fan belts at both sides of belts.

### 3.06 MAINTENANCE AND ACCESS TO EQUIPMENT

- A. Where valves, dampers, control devices, coils, or other like devices (i.e, plumbing P-trap, water hammer arresters, gauges, thermometers) requiring maintenance, checking or readings are inaccessibly concealed in walls or ceilings, and where indicated, provide square or rectangular access doors. Where space permits, doors for ceiling installation shall not be less than 18-inches by 18-inches. Prior to installation, verify all access locations.
- B. Where there are lubrications within equipment, extend such to exterior of equipment.

### 3.07 REVIEW OF WORK

- A. Do not allow or cause any mechanical work to be covered, concealed or enclosed until such work has been tested and reviewed. Should such work be covered, concealed or enclosed before being tested and reviewed, such shall be uncovered and thereafter restored at no additional cost.

### 3.08 EQUIPMENT IDENTIFICATION

- A. Manufacturer's Nameplates: Provide all equipment with manufacturer's nameplates secured to

the respective equipment and indicating, but not being limited to, the manufacturer's name, model, size, serial number, capacity and electrical characteristics. Clean, polish and protect all such nameplates with a coat of clear protective finish.

- B. Equipment Tags: Identify all equipment (such as machinery, motor starters, control panels, pushbuttons and other like devices) exposed to view with identification tags. Secure tags to equipment surface. Where size or surface curvature does not permit such, secure with No. 16 brass jack chain.

### **3.09 PRIMING, PAINTING, AND COATING**

- A. Properly clean surfaces to be touched up of rust, dirt, scale, wax and other deleterious materials. Prime surfaces. Touch up with like material all damaged galvanized or factory-primed metal surfaces. Do not prime over manufacturer's nameplates on equipment.
- B. Coat all bare steel parts of piping accessories below grade with coats of coal-tar based bituminous mastic.
- C. Except for factory priming, factory finish painting and otherwise specified under this Article, all field priming (except touch up) and finish painting shall be under other Divisions.
- D. Paint flat black interior surfaces of all concealed unlined galvanized sheet metal duct work behind air outlets and inlets.
- E. All exposed insulation surfaces in finished areas shall be ready for finish painting; glue size if necessary.

### **3.10 CLEANING AND DE-GREASING OF PIPING**

- A. General:
  - 1. Clean all piping systems to remove all dirt, grease, scale, foreign substances, etc., as specified in each separate section of the Specifications.
  - 2. Prior to commencing work, submit for approval a complete procedure for cleaning and flushing for each separate piping system. Include flushing source, system inlet flushing pressure and size of inlet and outlet flushing connections with their locations for each system. Install flushing connections at all low points of each piping system to ensure complete flushing of the system.
  - 3. Use air and/or gas blown through the lines of gas and air systems, unless specified otherwise, to prove the piping clean. All other piping systems shall be thoroughly flushed out with water unless specified otherwise.

### **3.11 TESTS AND ADJUSTMENTS**

- A. At the completion of the Work, completely adjust all valves and equipment for their proper use and rating.

**END OF SECTION**

**SECTION 23 0529****HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT****PART 1 GENERAL****1.01 SUMMARY**

- A. Section Includes:
  - 1. Metal pipe hangers and supports.
  - 2. Trapeze pipe hangers.
  - 3. Thermal-hanger shield inserts.
  - 4. Fastener systems.
  - 5. Equipment supports.
  - 6. Metal framing systems
- B. Related Sections:
  - 1. Division 05 Section "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
  - 2. Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" for vibration isolation devices.
  - 3. Division 23 Section(s) "Metal Ducts" for duct hangers and supports.

**1.02 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for HVAC piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
  - 1. Design supports for multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.
  - 2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
  - 3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

**1.03 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following; include Product Data for components:
  - 1. Trapeze pipe hangers.
  - 2. Equipment supports.
- C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Welding certificates.

**1.04 QUALITY ASSURANCE**

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

**PART 2 PRODUCTS****2.01 METAL PIPE HANGERS AND SUPPORTS**

- A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
  2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
  3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
  4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
  5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
- B. Copper Pipe Hangers:
1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
  2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

## 2.02 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

## 2.03 THERMAL-HANGER SHIELD INSERTS

- A. Insulation-Insert Material for Cold Piping: ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig (862-kPa) minimum compressive strength and vapor barrier.
- B. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig (688-kPa) or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig (862-kPa) minimum compressive strength.
- C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- E. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

## 2.04 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

## 2.05 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

## 2.06 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
1. Properties: Nonstaining, noncorrosive, and nongaseous.
  2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

## PART 3 EXECUTION

### 3.01 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
  2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- D. Fastener System Installation:
1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches (100 mm) thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
  2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- F. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- G. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- H. Install lateral bracing with pipe hangers and supports to prevent swaying.
- I. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 (DN 65) and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- J. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- K. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- L. Insulated Piping:
1. Attach clamps and spacers to piping.
    - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
  2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.
  3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.
  4. Shield Dimensions for Pipe: Not less than the following:
    - a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
    - b. NPS 4 (DN 100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
    - c. NPS 5 and NPS 6 (DN 125 and DN 150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.



- d. NPS 8 to NPS 14 (DN 200 to DN 350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.
  - e. NPS 16 to NPS 24 (DN 400 to DN 600): 24 inches (610 mm) long and 0.105 inch (2.67 mm) thick.
5. Pipes NPS 8 (DN 200) and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
  6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

### 3.02 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

### 3.03 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
  1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  2. Obtain fusion without undercut or overlap.
  3. Remove welding flux immediately.
  4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

### 3.04 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm).

### 3.05 PAINTING

- A. Touchup: 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.
  1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).
- B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

### 3.06 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

- E. Use carbon-steel pipe hangers and supports and metal trapeze pipe hangers and attachments for general service applications.
- F. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.
- G. Use padded hangers for piping that is subject to scratching.
- H. Use thermal-hanger shield inserts for insulated piping and tubing.
- I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system 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 (DN 15 to DN 750).
  - 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of up to 1050 deg F (566 deg C), pipes NPS 4 to NPS 24 (DN 100 to DN 600), requiring up to 4 inches (100 mm) of insulation.
  - 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36 (DN 20 to DN 900), requiring clamp flexibility and up to 4 inches (100 mm) of insulation.
  - 4. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 to NPS 8 (DN 15 to DN 200).
  - 5. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).
- J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24 (DN 24 to DN 600).
  - 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 (DN 20 to DN 600) if longer ends are required for riser clamps.
- K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
  - 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.
- L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
  - 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction, to attach to top flange of structural shape.
  - 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
  - 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
  - 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
  - 6. C-Clamps (MSS Type 23): For structural shapes.
  - 7. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    - a. Light (MSS Type 31): 750 lb (340 kg).
    - b. Medium (MSS Type 32): 1500 lb (680 kg).
    - c. Heavy (MSS Type 33): 3000 lb (1360 kg).
  - 8. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
  - 9. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

- M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
  - 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
  - 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- N. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- O. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

**END OF SECTION**

**SECTION 23 0548****VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Vibration isolators.
- B. Seismic restraints.

**1.02 RELATED SECTIONS**

- A. Section 03 3000 - Cast-in-Place Concrete.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Submittals, for submittal procedures.
- B. Product Data: Provide schedule of vibration isolator type with location and load on each.
- C. Shop Drawings: Indicate inertia bases and locate vibration isolators, with static and dynamic load on each. Indicate seismic control measures.
- D. Manufacturer's Instructions: Indicate installation instructions with special procedures and setting dimensions.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. MW Sausse, Inc.
- B. Kinetics Noise Control, Inc: [www.kineticsnoise.com](http://www.kineticsnoise.com).
- C. Mason Industries: [www.mason-ind.com](http://www.mason-ind.com).

**2.02 VIBRATION ISOLATORS**

- A. Closed Spring Isolators:
  - 1. Type: Closed spring mount with top and bottom housing separated with neoprene rubber stabilizers.
  - 2. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.
  - 3. Housings: Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators, and neoprene side stabilizers with minimum 0.25 inch (7 mm) clearance.
  - 4. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.
- B. Restrained Closed Spring Isolators:
  - 1. Type: Closed spring mount with top and bottom housing separated with neoprene rubber stabilizers.
  - 2. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.
  - 3. Housings: Incorporate neoprene isolation pad meeting requirements for neoprene pad isolators, and neoprene side stabilizers with minimum 0.25 inch (7 mm) clearance and limit stops.
  - 4. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.
- C. Spring Hanger:
  - 1. Springs: Minimum horizontal stiffness equal to 75 percent vertical stiffness, with working deflection between 0.3 and 0.6 of maximum deflection. Color code springs for load carrying capacity.
  - 2. Housings: Incorporate rubber hanger with threaded insert.
  - 3. Misalignment: Capable of 20 degree hanger rod misalignment.

4. For Exterior and Humid Areas: Hot dipped galvanized housings and neoprene coated springs.
- D. Neoprene Pad Isolators:
1. Rubber or neoprene waffle pads.
    - a. Hardness: 30 durometer.
    - b. Thickness: Minimum 1/2 inch (13 mm).
    - c. Maximum Loading: 50 psi (345 kPa).
    - d. Rib Height: Maximum 0.7 times width.
  2. Configuration: Single layer.
  3. Configuration: 1/2 inch (13 mm) thick waffle pads bonded each side of 1/4 inch (6 mm) thick steel plate.
- E. Rubber Mount or Hanger: Molded rubber designed for 0.4 inch (10 mm) deflection with threaded insert.
- F. Seismic Snubbers:
1. Type: Non-directional and double acting unit consisting of interlocking steel members restrained by neoprene elements.
  2. Elements: Replaceable neoprene, minimum of 0.75 inch (18 mm) thick with minimum 1/8 inch (3 mm) air gap.
  3. Capacity: 4 times load assigned to mount groupings at 0.4 inch (10 mm) deflection.
  4. Attachment Points and Fasteners: Capable of withstanding 3 times rated load capacity of seismic snubber.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Bases:
  1. Set steel bases for one inch (25 mm) clearance between housekeeping pad and base.
  2. Adjust equipment level.
- C. On closed spring isolators, adjust so side stabilizers are clear under normal operating conditions.
- D. Prior to making piping connections to equipment with operating weights substantially different from installed weights, block up equipment with temporary shims to final height. When full load is applied, adjust isolators to load to allow shim removal.
- E. Provide pairs of horizontal limit springs on fans with more than 6.0 inches WC (1.5 kPa) static pressure, and on hanger supported, horizontally mounted axial fans.
- F. Provide seismic snubbers for all equipment, piping, and ductwork mounted on isolators. Each inertia base shall have minimum of four seismic snubbers located close to isolators. Snub equipment designated for post-disaster use to 0.05 inch (1.5 mm) maximum clearance. Other snubbers shall have clearance between 0.15 inch (4 mm) and 0.25 inch (7 mm).
- G. Support piping connections to equipment mounted on isolators using isolators or resilient hangers as follows:
  1. Up to 4 Inches (100 mm) Pipe Size: First three points of support.
  2. 5 to 8 Inches (125 to 200 mm) Pipe Size: First four points of support.
  3. 10 inches (250 mm) Pipe Size and Over: First six points of support.
  4. Select three hangers closest to vibration source for minimum 1.0 inch (25 mm) static deflection or static deflection of isolated equipment. Select remaining isolators for minimum 1.0 inch (25 mm) static deflection or 1/2 static deflection of isolated equipment.

#### **3.02 FIELD QUALITY CONTROL**

- A. Inspect isolated equipment after installation and submit report. Include static deflections.

#### **END OF SECTION**

**SECTION 23 0553**  
**IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT**

**PART 1 GENERAL****1.01 SUMMARY**

- A. Section Includes:
1. Equipment labels.
  2. Warning signs and labels.
  3. Pipe labels.
  4. Duct labels.
  5. Stencils.
  6. Warning Tags.

**1.02 SUBMITTAL**

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

**PART 2 PRODUCTS****2.01 EQUIPMENT LABELS**

- A. Metal Labels for Equipment:
1. Material and Thickness: Brass, 0.032-inch (0.8-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
  2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
  3. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  4. Fasteners: Stainless-steel rivets.
  5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Plastic Labels for Equipment:
1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
  2. Letter Color: White.
  3. Background Color: Black.
  4. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
  5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
  6. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  7. Fasteners: Stainless-steel rivets.
  8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.
- D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

**2.02 WARNING SIGNS AND LABELS**

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
- B. Letter Color: Black.
- C. Background Color: Yellow.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
- F. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel rivets.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

**2.03 PIPE LABELS**

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to partially cover circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
  - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
  - 2. Lettering Size: At least 1-1/2 inches (38 mm) high.

**2.04 DUCT LABELS**

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
- B. Letter Color: White.
- C. Background Color: Black.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
- F. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel rivets.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings, duct size, and an arrow indicating flow direction.
  - 1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.
  - 2. Lettering Size: At least 1-1/2 inches (38 mm) high.

**2.05 STENCILS**

- A. Stencils: Prepared with letter sizing according to ASME A13.1 for piping; min. letter height of 1-1/4 inch for ducts; and min letter height of 3/4 inch for access panel and door labels, equipment labels, and similar operational instructions.
  - 1. Stencil material: Fiberboard or metal
  - 2. Stencil paint: Exterior, gloss, acrylic enamel black unless otherwise indicated. Paint may be in pressurized spray can form.
  - 3. Identification paint: Exterior acrylic enamel in colors according to ASME 13.1 unless otherwise indicated.

**PART 3 EXECUTION****3.01 PREPARATION**

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

**3.02 EQUIPMENT LABEL INSTALLATION**

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

**3.03 PIPE LABEL INSTALLATION**

- A. Piping Color-Coding: Painting of piping is specified in Division 09 Section "Painting and Coating."
- B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed 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 inaccessible 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 (15 m) along each run. Reduce intervals to 25 feet (7.6 m) in areas of congested piping and equipment.
  - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- C. Pipe Label Color Schedule:
  - 1. Refrigerant Piping:
    - a. Background Color: White.
    - b. Letter Color: Black.

**3.04 DUCT LABEL INSTALLATION**

- A. Install plastic-laminated duct labels with permanent adhesive on air ducts in the following color codes:
  - 1. Blue: For supply ducts.
  - 2. Yellow: For return ducts.
  - 3. Green: For exhaust ducts.
  - 4. ASME A13.1 Colors and Designs: For hazardous material exhaust.
- B. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 50 feet (15 m) in each space where ducts are exposed or concealed by removable ceiling system.

**END OF SECTION**



**SECTION 23 0593**  
**TESTING, ADJUSTING, AND BALANCING**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Testing, adjustment, and balancing of air systems.
- B. Measurement of final operating condition of HVAC systems.
- C. Commissioning activities.

**1.02 ALLOWANCES**

- A. Allowance includes testing, adjusting, and balancing of mechanical systems.

**1.03 REFERENCES**

- A. AABC MN-1 - AABC National Standards for Total System Balance; Associated Air Balance Council; 2002.
- B. ASHRAE Std 111 - Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; 1988.
- C. NEBB (TAB) - Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems; National Environmental Balancing Bureau; 2005, Seventh Edition.
- D. SMACNA (TAB) - HVAC Systems Testing, Adjusting, and Balancing; Sheet Metal and Air Conditioning Contractors' National Association; 2002.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Submittals, for submittal procedures.
- B. Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.
- C. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
  - 1. Submit to the Construction Manager.
  - 2. Submit six weeks prior to starting the testing, adjusting, and balancing work.
  - 3. Include certification that the plan developer has reviewed the contract documents, the equipment and systems, and the control system with the Architect and other installers to sufficiently understand the design intent for each system.
  - 4. Include at least the following in the plan:
    - a. Preface: An explanation of the intended use of the control system.
    - b. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
    - c. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
    - d. Identification and types of measurement instruments to be used and their most recent calibration date.
    - e. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
    - f. Final test report forms to be used.
    - g. Detailed step-by-step procedures for TAB work for each system and issue, including:
      - 1) Terminal flow calibration (for each terminal type).
      - 2) Diffuser proportioning.
      - 3) Branch/submain proportioning.
      - 4) Total flow calculations.
      - 5) Rechecking.
      - 6) Diversity issues.

- h. Expected problems and solutions, etc.
  - i. Criteria for using air flow straighteners or relocating flow stations and sensors.
  - j. Details of how TOTAL flow will be determined; for example:
    - 1) Air: Sum of terminal flows via control system calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations.
  - k. Specific procedures that will ensure that air side is operating at the lowest possible pressures and methods to verify this.
  - l. Confirmation of understanding of the outside air ventilation criteria under all conditions.
  - m. Method of verifying and setting minimum outside air flow rate will be verified and set and for what level (total building, zone, etc.).
  - n. Method of checking building static and exhaust fan and/or relief damper capacity.
  - o. Proposed selection points for sound measurements and sound measurement methods.
  - p. Methods for making coil or other system plant capacity measurements, if specified.
  - q. Time schedule for TAB work to be done in phases (by floor, etc.).
  - r. Description of TAB work for areas to be built out later, if any.
  - s. Time schedule for deferred or seasonal TAB work, if specified.
  - t. False loading of systems to complete TAB work, if specified.
  - u. Exhaust fan balancing and capacity verifications, including any required room pressure differentials.
  - v. Procedures for field technician logs of discrepancies, deficient or uncompleted work by others, contract interpretation requests and lists of completed tests (scope and frequency).
  - w. Procedures for formal progress reports, including scope and frequency.
  - x. Procedures for formal deficiency reports, including scope, frequency and distribution.
- D. Control System Coordination Reports: Communicate in writing to the controls installer all setpoint and parameter changes made or problems and discrepancies identified during TAB which affect the control system setup and operation.
- E. Progress Reports.
- F. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
- 1. Submit under provisions of Section 01 3000, Submittals.
  - 2. Submit to the Construction Manager and HVAC controls contractor within two weeks after completion of testing, adjusting, and balancing.
  - 3. Revise TAB plan to reflect actual procedures and submit as part of final report.
  - 4. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
  - 5. Provide reports in 3 ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.
  - 6. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
  - 7. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
  - 8. Units of Measure: Report data in I-P (inch-pound) units only.
  - 9. Include the following on the title page of each report:
    - a. Name of Testing, Adjusting, and Balancing Agency.
    - b. Address of Testing, Adjusting, and Balancing Agency.
    - c. Telephone number of Testing, Adjusting, and Balancing Agency.
    - d. Project name.
    - e. Project location.

- f. Project Owner.
- g. Project Engineer.
- h. Project Contractor.
- i. Project altitude.
- j. Report date.

- G. Project Record Documents: Record actual locations of flow measuring stations and balancing valves and rough setting.

## **PART 2 PRODUCTS - NOT USED**

## **PART 3 EXECUTION**

### **3.01 GENERAL REQUIREMENTS**

- A. Perform total system balance in accordance with one of the following:
  - 1. AABC MN-1, AABC National Standards for Total System Balance.
  - 2. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems.
  - 3. Maintain at least one copy of the standard to be used at project site at all times.
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.
- D. TAB Agency Qualifications:
  - 1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
  - 2. Having minimum of three years documented experience.
  - 3. Certified by one of the following:
    - a. AABC, Associated Air Balance Council: [www.aabchq.com](http://www.aabchq.com); upon completion submit AABC National Performance Guaranty.
    - b. NEBB, National Environmental Balancing Bureau: [www.nebb.org](http://www.nebb.org).
- E. TAB Supervisor Qualifications: Certified by same organization as TAB agency.
- F. TAB Supervisor Qualifications: Professional Engineer licensed in the State in which the Project is located.

### **3.02 EXAMINATION**

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
  - 1. Systems are started and operating in a safe and normal condition.
  - 2. Temperature control systems are installed complete and operable.
  - 3. Proper thermal overload protection is in place for electrical equipment.
  - 4. Duct systems are clean of debris.
  - 5. Fans are rotating correctly.
  - 6. Air outlets are installed and connected.
  - 7. Duct system leakage is minimized.
  - 8. Service and balance valves are open.
- B. Submit field reports. Report defects and deficiencies noted during performance of services which prevent system balance.
- C. Beginning of work means acceptance of existing conditions.

### **3.03 PREPARATION**

- A. Hold a pre-balancing meeting at least one week prior to starting TAB work.
  - 1. Require attendance by all installers whose work will be tested, adjusted, or balanced.
- B. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Owner to facilitate spot checks during testing.

- C. Provide additional balancing devices as required.

### 3.04 INSTALLATION TOLERANCES

- A. Air Handling Systems: Adjust to within plus or minus 10 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
- B. Air Outlets and Inlets: Adjust total to within plus or minus 10 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

### 3.05 RECORDING AND ADJUSTING

- A. Field Logs: Maintain written logs including:
  - 1. Running log of events and issues.
  - 2. Discrepancies, deficient or uncompleted work by others.
  - 3. Contract interpretation requests.
  - 4. Lists of completed tests.
- B. Ensure recorded data represents actual measured or observed conditions.
- C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
- D. Mark on the drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.
- E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- G. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.
- H. Check and adjust systems approximately six months after final acceptance and submit report.

### 3.06 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
- B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.
- E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- K. Where modulating dampers are provided, take measurements and balance at extreme conditions. Balance variable volume systems at maximum air flow rate, full cooling, and at

minimum air flow rate, full heating.

- L. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches (12.5 Pa) positive static pressure near the building entries.

### 3.07 SCOPE

- A. Test, adjust, and balance the following:
  - 1. Fans
  - 2. Air Inlets and Outlets
  - 3. Shop Air Compressor
  - 4. Breathing Air Compressor

### 3.08 MINIMUM DATA TO BE REPORTED

- A. Electric Motors:
  - 1. Manufacturer
  - 2. Model/Frame
  - 3. HP/BHP
  - 4. Phase, voltage, amperage; nameplate, actual, no load
  - 5. RPM
  - 6. Service factor
  - 7. Starter size, rating, heater elements
  - 8. Sheave Make/Size/Bore
- B. V-Belt Drives:
  - 1. Identification/location
  - 2. Required driven RPM
  - 3. Driven sheave, diameter and RPM
  - 4. Belt, size and quantity
  - 5. Motor sheave diameter and RPM
  - 6. Center to center distance, maximum, minimum, and actual
- C. Air Moving Equipment:
  - 1. Location
  - 2. Manufacturer
  - 3. Model number
  - 4. Serial number
  - 5. Arrangement/Class/Discharge
  - 6. Air flow, specified and actual
  - 7. Return air flow, specified and actual
  - 8. Outside air flow, specified and actual
  - 9. Total static pressure (total external), specified and actual
  - 10. Inlet pressure
  - 11. Discharge pressure
  - 12. Sheave Make/Size/Bore
  - 13. Number of Belts/Make/Size
  - 14. Fan RPM
- D. Exhaust Fans:
  - 1. Location
  - 2. Manufacturer
  - 3. Model number
  - 4. Serial number
  - 5. Air flow, specified and actual
  - 6. Total static pressure (total external), specified and actual
  - 7. Inlet pressure
  - 8. Discharge pressure

9. Sheave Make/Size/Bore
  10. Number of Belts/Make/Size
  11. Fan RPM
- E. Air Distribution Tests:
1. Air terminal number
  2. Room number/location
  3. Terminal type
  4. Terminal size
  5. Area factor
  6. Design velocity
  7. Design air flow
  8. Test (final) velocity
  9. Test (final) air flow
  10. Percent of design air flow

**END OF SECTION**

**SECTION 23 1123**  
**FACILITY NATURAL-GAS PIPING**

**PART 1 GENERAL****1.01 SUMMARY**

- A. Section Includes:
  - 1. Pipes, tubes, and fittings.
  - 2. Piping specialties.
  - 3. Piping and tubing joining materials.
  - 4. Valves.
  - 5. Pressure regulators.

**1.02 PERFORMANCE REQUIREMENTS**

- A. Minimum Operating-Pressure Ratings:
  - 1. Piping and Valves: 100 psig minimum unless otherwise indicated.
  - 2. Service Regulators: 65 psig minimum unless otherwise indicated.
- B. Natural-Gas System Pressure within Buildings: 0.5 psig or less.
- C. Delegated Design: Design restraints and anchors for natural -gas piping and equipment, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

**1.03 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For facility natural-gas piping layout. Include plans, piping layout and elevations, sections, and details for fabrication of pipe anchors, hangers, supports for multiple pipes, alignment guides, expansion joints and loops, and attachments of the same to building structure. Detail location of anchors, alignment guides, and expansion joints and loops.
- C. Delegated-Design Submittal: For natural-gas piping and equipment indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  - 1. Detail fabrication and assembly of seismic restraints.
  - 2. Design Calculations: Calculate requirements for selecting seismic restraints.
- D. Welding certificates.
- E. Field quality-control reports.
- F. Operation and maintenance data.

**1.04 QUALITY ASSURANCE**

- A. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

**PART 2 PRODUCTS****2.01 PIPES, TUBES, AND FITTINGS**

- A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
  - 1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
  - 2. Wrought-Steel Welding Fittings: ASTM A 234/A 234M for butt welding and socket welding.
  - 3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.

4. Protective Coating for Underground Piping: Factory-applied, three-layer coating of epoxy, adhesive, and PE.
  - a. Joint Cover Kits: Epoxy paint, adhesive, and heat-shrink PE sleeves.
- B. PE Pipe: ASTM D 2513, SDR 11.
  1. PE Fittings: ASTM D 2683, socket-fusion type or ASTM D 3261, butt-fusion type with dimensions matching PE pipe.
  2. PE Transition Fittings: Factory -fabricated fittings with PE pipe complying with ASTM D 2513, SDR 11; and steel pipe complying with ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
  3. Anodeless Service-Line Risers: Factory fabricated and leak tested.
    - a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet.
    - b. Casing: Steel pipe complying with ASTM A 53/A 53M, Schedule 40, black steel, Type E or S, Grade B, with corrosion-protective coating covering. Vent casing aboveground.
    - c. Aboveground Portion: PE transition fitting.
    - d. Outlet shall be threaded or suitable for welded connection.
    - e. Tracer wire connection.
    - f. Ultraviolet shield.
    - g. Stake supports with factory finish to match steel pipe casing or carrier pipe.
  4. Transition Service-Line Risers: Factory fabricated and leak tested.
    - a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet connected to steel pipe complying with ASTM A 53/A 53M, Schedule 40, Type E or S, Grade B, with corrosion-protective coating for aboveground outlet.
    - b. Outlet shall be threaded or suitable for welded connection.
    - c. Bridging sleeve over mechanical coupling.
    - d. Factory-connected anode.
    - e. Tracer wire connection.
    - f. Ultraviolet shield.
    - g. Stake supports with factory finish to match steel pipe casing or carrier pipe.

## 2.02 PIPING SPECIALTIES

- A. Appliance Flexible Connectors:
  1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
  2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
  3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
  4. Corrugated stainless-steel tubing with polymer coating.
  5. Operating-Pressure Rating: 0.5 psig.
  6. End Fittings: Zinc-coated steel.
  7. Threaded Ends: Comply with ASME B1.20.1.
  8. Maximum Length: 72 inches.
- B. Quick-Disconnect Devices: Comply with ANSI Z21.41.
  1. Copper-alloy convenience outlet and matching plug connector.
  2. Nitrile seals.
  3. Hand operated with automatic shutoff when disconnected.
  4. For indoor or outdoor applications.
  5. Adjustable, retractable restraining cable.
- C. Y-Pattern Strainers:
  1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
  2. End Connections: Threaded ends for NPS 2 and smaller.
  3. Strainer Screen: 40-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
  4. CWP Rating: 125 psig.



- D. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

### 2.03 JOINING MATERIALS

- A. Joint Compound and Tape: Suitable for natural gas.
- B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- C. Brazing Filler Metals: Alloy with melting point greater than 1 000 deg F complying with AWS A5.8/A5.8M. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.

### 2.04 MANUAL GAS SHUTOFF VALVES

- A. See "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles for where each valve type is applied in various services.
- B. General Requirements for Metallic Valves, NPS 2 and Smaller: Comply with ASME B16.33.
1. CWP Rating: 125 psig.
  2. Threaded Ends: Comply with ASME B1.20.1.
  3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
  4. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
  5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
  6. Service Mark: Valves 1-1/4 inches to NPS 2 shall have initials "WOG" permanently marked on valve body.
- C. One-Piece, Bronze Ball Valve with Bronze Trim: MSS SP-110.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. BrassCraft Manufacturing Company; a Masco company.
    - b. Conbraco Industries, Inc.; Apollo Div.
    - c. Lyall, R. W. & Company, Inc.
    - d. McDonald, A. Y. Mfg. Co.
    - e. Perfection Corporation; a subsidiary of American Meter Company.
  2. Body: Bronze, complying with ASTM B 584.
  3. Ball: Chrome-plated brass.
  4. Stem: Bronze; blowout proof.
  5. Seats: Reinforced TFE; blowout proof.
  6. Packing: Separate packnut with adjustable-stem packing threaded ends.
  7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
  8. CWP Rating: 600 psig.
  9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
  10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- D. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. BrassCraft Manufacturing Company; a Masco company.
    - b. Conbraco Industries, Inc.; Apollo Div.
    - c. Lyall, R. W. & Company, Inc.
    - d. McDonald, A. Y. Mfg. Co.
    - e. Perfection Corporation; a subsidiary of American Meter Company.
  2. Body: Bronze, complying with ASTM B 584.

3. Ball: Chrome-plated bronze.
  4. Stem: Bronze; blowout proof.
  5. Seats: Reinforced TFE; blowout proof.
  6. Packing: Threaded-body packnut design with adjustable-stem packing.
  7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
  8. CWP Rating: 600 psig.
  9. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
  10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- E. Bronze Plug Valves: MSS SP-78.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Lee Brass Company.
    - b. McDonald, A. Y. Mfg. Co.
  2. Body: Bronze, complying with ASTM B 584.
  3. Plug: Bronze.
  4. Ends: Threaded, socket, as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
  5. Operator: Square head or lug type with tamperproof feature where indicated.
  6. Pressure Class: 125 psig.
  7. Listing: Valves NPS 1 and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
  8. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- F. PE Ball Valves: Comply with ASME B16.40.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Kerotest Manufacturing Corp.
    - b. Lyall, R. W. & Company, Inc.
    - c. Perfection Corporation; a subsidiary of American Meter Company.
  2. Body: PE.
  3. Ball: PE.
  4. Stem: Acetal.
  5. Seats and Seals: Nitrile.
  6. Ends: Plain or fusible to match piping.
  7. CWP Rating: 80 psig.
  8. Operating Temperature: Minus 20 to plus 140 deg F.
  9. Operator: Nut or flat head for key operation.
  10. Include plastic valve extension.
  11. Include tamperproof locking feature for valves where indicated on Drawings.
- G. Valve Boxes:
1. Cast-iron, two-section box.
  2. Top section with cover with "GAS" lettering.
  3. Bottom section with base to fit over valve and barrel a minimum of 5 inches in diameter.
  4. Adjustable cast-iron extensions of length required for depth of bury.
  5. Include tee-handle, steel operating wrench with socket end fitting valve nut or flat head, and with stem of length required to operate valve.

## 2.05 PRESSURE REGULATORS

- A. General Requirements:
1. Single stage and suitable for natural gas.
  2. Steel jacket and corrosion-resistant components.
  3. Elevation compensator.

4. End Connections: Threaded for regulators NPS 2 and smaller.
- B. Line Pressure Regulators: Comply with ANSI Z21.80.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Maxitrol Company.
    - b. Actaris.
    - c. American Meter Company.
    - d. Eclipse Combustion, Inc.
    - e. Fisher Control Valves and Regulators; Division of Emerson Process Management.
    - f. Invensys.
    - g. Richards Industries; Jordan Valve Div.
  2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
  3. Springs: Zinc-plated steel; interchangeable.
  4. Diaphragm Plate: Zinc-plated steel.
  5. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
  6. Orifice: Aluminum; interchangeable.
  7. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
  8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
  9. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
  10. Overpressure Protection Device: Factory mounted on pressure regulator.
  11. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
  12. Maximum Inlet Pressure: 2 psig.

## 2.06 DIELECTRIC UNIONS

- A. Dielectric Unions:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Capitol Manufacturing Company.
    - b. Central Plastics Company.
    - c. Hart Industries International, Inc.
    - d. Jomar International Ltd.
    - e. Matco-Norca, Inc.
    - f. McDonald, A. Y. Mfg. Co.
    - g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
    - h. Wilkins; a Zurn company.
  2. Description:
    - a. Standard: ASSE 1079.
    - b. Pressure Rating: 125 psig minimum at 180 deg F.
    - c. End Connections: Solder-joint copper alloy and threaded ferrous.

## 2.07 LABELING AND IDENTIFYING

- A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

## PART 3 EXECUTION

### 3.01 OUTDOOR PIPING INSTALLATION

- A. Comply with NFPA 54 for installation and purging of natural-gas piping.

- B. Install underground, natural-gas piping buried at least 36 inches below finished grade. Comply with requirements in Division 31 Sections for excavating, trenching, and backfilling.
  - 1. If natural-gas piping is installed less than 36 inches below finished grade, install it in containment conduit.
- C. Install underground, PE, natural-gas piping according to ASTM D 2774.
- D. Steel Piping with Protective Coating:
  - 1. Apply joint cover kits to pipe after joining to cover, seal, and protect joints.
  - 2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer.
  - 3. Replace pipe having damaged PE coating with new pipe.
- E. Install fittings for changes in direction and branch connections.
- F. Install pressure gage downstream from each service regulator.

### 3.02 INDOOR PIPING INSTALLATION

- A. Comply with NFPA 54 for installation and purging of natural-gas piping.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.
- D. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- E. 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.
- F. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- G. Locate valves for easy access.
- H. Install natural-gas piping at uniform grade of 2 percent down toward drip and sediment traps.
- I. Install piping free of sags and bends.
- J. Install fittings for changes in direction and branch connections.
- K. Verify final equipment locations for roughing-in.
- L. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements.
- M. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.
  - 1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.
- N. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.
- O. 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.
- P. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
- Q. Connect branch piping from top or side of horizontal piping.

- R. Install unions in pipes NPS 2 and smaller, adjacent to each valve, at final connection to each piece of equipment.
- S. Do not use natural-gas piping as grounding electrode.
- T. Install strainer on inlet of each line-pressure regulator and automatic or electrically operated valve.
- U. Install pressure gage downstream from each line regulator.
- V. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."
- W. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Division 22 Section "Sleeves and Sleeve Seals for Plumbing Piping."
- X. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 22 Section "Escutcheons for Plumbing Piping."

### 3.03 VALVE INSTALLATION

- A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing or copper connector.
- B. Install underground valves with valve boxes.
- C. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.
- D. Install earthquake valves aboveground outside buildings according to listing.
- E. Install anode for metallic valves in underground PE piping.

### 3.04 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints:
  1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
  2. Cut threads full and clean using sharp dies.
  3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
  4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
  5. 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.
- D. Welded Joints:
  1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
  2. Bevel plain ends of steel pipe.
  3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.
- F. Flared Joints: Cut tubing with roll cutting tool. Flare tube end with tool to result in flare dimensions complying with SAE J513. Tighten finger tight, then use wrench. Do not overtighten.
- G. 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.

### 3.05 HANGER AND SUPPORT INSTALLATION

- A. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- B. Comply with requirements for pipe hangers and supports specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."
- C. 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.
- D. Install hangers for horizontal, corrugated stainless-steel tubing with the following maximum spacing and minimum rod sizes:
  1. NPS 3/8: Maximum span, 48 inches; minimum rod size, 3/8 inch.
  2. NPS 1/2: Maximum span, 72 inches; minimum rod size, 3/8 inch.
  3. NPS 3/4 and Larger: Maximum span, 96 inches; minimum rod size, 3/8 inch.

### 3.06 CONNECTIONS

- A. Connect to utility's gas main according to utility's procedures and requirements.
- B. Install natural-gas piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.
- C. Install piping adjacent to appliances to allow service and maintenance of appliances.
- D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.
- E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

### 3.07 LABELING AND IDENTIFYING

- A. Comply with requirements in Division 23 Section "Identification for Piping and Equipment" for piping and valve identification.
- B. Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

### 3.08 FIELD QUALITY CONTROL

- A. Test, inspect, and purge natural gas according to NFPA 54 and authorities having jurisdiction. Testing criteria shall be 1.5 times working pressure for a duration of four hours.
- B. Natural-gas piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

### 3.09 OUTDOOR PIPING SCHEDULE

- A. Underground natural-gas piping shall be the following:
  1. PE pipe and fittings joined by heat fusion; service-line risers with tracer wire terminated in an accessible location.
- B. Aboveground natural-gas piping shall be one of the following:
  1. Steel pipe with malleable-iron fittings and threaded joints.
  2. Steel pipe with wrought-steel fittings and welded joints.
- C. Branch Piping in Cast-in-Place Concrete to Single Appliance: Annealed-temper copper tube with wrought-copper fittings and brazed joints. Install piping embedded in concrete with no joints in concrete.

- D. Containment Conduit: Steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.

### **3.10 INDOOR PIPING SCHEDULE**

- A. Aboveground, branch piping NPS 3 and smaller shall be the following:
  - 1. Steel pipe with malleable-iron fittings and threaded joints.
- B. Aboveground, distribution piping shall be one of the following:
  - 1. Steel pipe with malleable-iron fittings and threaded joints.
  - 2. Steel pipe with wrought-steel fittings and welded joints.
- C. Underground, below building, piping shall be one of the following:
  - 1. Steel pipe with malleable-iron fittings and threaded joints.
  - 2. Steel pipe with wrought-steel fittings and welded joints.
- D. Containment Conduit: Steel pipe with wrought-steel fittings and welded joints. Coat pipe and fittings with protective coating for steel piping.
- E. Containment Conduit Vent Piping: Steel pipe with malleable -iron fittings and threaded or wrought-steel fittings with welded joints. Coat underground pipe and fittings with protective coating for steel piping.

### **3.11 UNDERGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE**

- A. Connections to Existing Gas Piping: Use valve and fitting assemblies made for tapping utility's gas mains and listed by an NRTL.
- B. Underground: PE valves.

### **3.12 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE**

- A. Valves for pipe sizes NPS 3 and smaller at service meter shall be the following:
  - 1. Two-piece, full-port, bronze ball valves with bronze trim.
- B. Distribution piping valves for pipe sizes NPS 2 and smaller shall be the following:
  - 1. One-piece, bronze ball valve with bronze trim.
  - 2. Two-piece, full-port, bronze ball valves with bronze trim.
  - 3. Bronze plug valve.
- C. Valves in branch piping for single appliance shall be the following:
  - 1. Bronze plug valve.

**END OF SECTION**

**SECTION 23 3113**  
**DUCTS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Metal ductwork.
- B. Casing and plenums.
- C. Flexible ductwork.

**1.02 RELATED SECTIONS**

- A. Section 09 9000 - Paints and Coatings: Weld priming, weather resistant, paint or coating.
- B. Section 23 3300 - Air Duct Accessories.
- C. Section 23 3713 - Diffusers, Registers, and Grilles.
- D. Section 23 0593 - Testing, Adjusting, and Balancing.

**1.03 REFERENCES**

- A. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2005a.
- B. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems; National Fire Protection Association; 2002.
- C. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems; National Fire Protection Association; 2006.
- D. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; National Fire Protection Association; 2004.
- E. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; Sheet Metal and Air Conditioning Contractors' National Association; 1985, First Edition.
- F. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; 2005.
- G. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Underwriters Laboratories Inc.; 2005.

**1.04 PERFORMANCE REQUIREMENTS**

- A. No variation of duct configuration or sizes permitted except by written permission. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Submittals, for submittal procedures.
- B. Product Data: Provide data for duct materials, duct liner, and duct connections.
- C. Shop Drawings: Indicate duct fittings, particulars such as gages, sizes, welds, and configuration prior to start of work for all systems.
- D. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual.
- E. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

**1.06 REGULATORY REQUIREMENTS**

- A. Construct ductwork to NFPA 90A, NFPA 90B, and NFPA 96 standards.

**1.07 ENVIRONMENTAL REQUIREMENTS**

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.



- B. Maintain temperatures within acceptable range during and after installation of duct sealants.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Galvanized Steel Ducts: Hot-dipped galvanized steel sheet, ASTM A 653/A 653M FS Type B, with G90/Z275 coating.
- B. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
  - 1. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
  - 2. VOC Content: Not more than 250 g/L, excluding water.
  - 3. Surface Burning Characteristics: Flame spread of zero, smoke developed of zero, when tested in accordance with ASTM E 84.
  - 4. For Use With Flexible Ducts: UL labeled.
- C. Hanger Rod: ASTM A 36/A 36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

### **2.02 DUCTWORK FABRICATION**

- A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- B. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fiber insulation.
- C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- D. Fabricate continuously welded round and oval duct fittings two gages heavier than duct gages indicated in SMACNA Standard. Joints shall be minimum 4 inch (100 mm) cemented slip joint, brazed or electric welded. Prime coat welded joints.
- E. Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.
- F. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

### **2.03 DUCT MANUFACTURERS**

- A. Metal-Fab, Inc: [www.mtlfab.com](http://www.mtlfab.com).
- B. SEMCO Incorporated: [www.semcoinc.com](http://www.semcoinc.com).
- C. United McGill Corporation: [www.unitedmcgill.com](http://www.unitedmcgill.com).

### **2.04 MANUFACTURED METAL DUCTWORK AND FITTINGS**

- A. Manufacture in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- B. Flat Oval Ducts: Machine made from round spiral lockseam duct with light reinforcing corrugations; fittings manufactured of at least two gages heavier metal than duct.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.

- C. Install and seal metal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- D. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal cap with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
- E. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- F. Use crimp joints with or without bead for joining round duct sizes 8 inch (200 mm) and smaller with crimp in direction of air flow.
- G. Use double nuts and lock washers on threaded rod supports.
- H. Set plenum doors 6 to 12 inches (150 to 300 mm) above floor. Arrange door swings so that fan static pressure holds door in closed position.
- I. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- J. At exterior wall louvers, seal duct to louver frame.

**3.02 SCHEDULES**

- A. Ductwork Material:
  - 1. General Exhaust & Outside Air: Galvanized Steel.
- B. Ductwork Pressure Class:
  - 1. General Exhaust & Outside Air: 1 inch (250 Pa).

**END OF SECTION**

**SECTION 23 3300**  
**AIR DUCT ACCESSORIES**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Backdraft dampers.
- B. Duct test holes.
- C. Volume control dampers.

**1.02 RELATED SECTIONS**

- A. Section 23 0548 – Vibration and Seismic Controls for HVAC Piping and Equipment.
- B. Section 23 3113 - Ducts.

**1.03 REFERENCES**

- A. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems; National Fire Protection Association; 2002.
- B. NFPA 92A - Standard on Smoke-Control Systems; National Fire Protection Association; 2006.
- C. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; 2005.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Submittals, for submittal procedures.
- B. Product Data: Provide for shop fabricated assemblies including volume control dampers, duct access doors, duct test holes, and hardware used. Include electrical characteristics and connection requirements.
- C. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers, duct access doors, and duct test holes.

**1.05 PROJECT RECORD DOCUMENTS**

- A. Record actual locations of access doors and test holes.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Protect dampers from damage to operating linkages and blades.

**1.08 EXTRA MATERIALS**

- A. See Section 01 6000 - Product Requirements, for additional provisions.

**PART 2 PRODUCTS****2.01 BACKDRAFT DAMPERS**

- A. Manufacturers:
  - 1. Nailor Industries Inc: [www.nailor.com](http://www.nailor.com).
  - 2. Ruskin Company: [www.ruskin.com](http://www.ruskin.com).
  - 3. Greenheck.
- B. Gravity Backdraft Dampers, Size 18 x 18 inches (450 x 450 mm) or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.
- C. Multi-Blade, Parallel Action Gravity Balanced Backdraft Dampers: galvanized steel, with center pivoted blades of maximum 6 inch (150 mm) width, with felt or flexible vinyl sealed edges, linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel

pivot pin; adjustment device to permit setting for varying differential static pressure.

## **2.02 DUCT TEST HOLES**

- A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.
- B. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

## **2.03 VOLUME CONTROL DAMPERS**

- A. Manufacturers:
  - 1. Louvers & Dampers, Inc: [www.louvers-dampers.com](http://www.louvers-dampers.com).
  - 2. Nailor Industries Inc: [www.nailor.com](http://www.nailor.com).
  - 3. Ruskin Company: [www.ruskin.com](http://www.ruskin.com).
  - 4. Greenheck.
- B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.
- C. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inch (150 x 760 mm).
- D. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 x 72 inch (200 x 1825 mm). Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
- E. End Bearings: Except in round ducts 12 inches (300 mm) and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearings.
- F. Quadrants:
  - 1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
  - 2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
  - 3. Where rod lengths exceed 30 inches (750 mm) provide regulator at both ends.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Verify that electric power is available and of the correct characteristics.

### **3.02 INSTALLATION**

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 23 3113 for duct construction and pressure class.
- B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- C. Provide duct test holes where indicated and required for testing and balancing purposes.
- D. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
- E. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment; see Section 23 0548.
- F. Provide balancing dampers at points on exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.
- G. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

**END OF SECTION**

**SECTION 23 3423**  
**HVAC POWER VENTILATORS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Cabinet inline exhaust fans.
- B. Ceiling exhaust fans.
- C. Centrifugal roof ventilators.

**1.02 RELATED SECTIONS**

- A. Section 23 0548 - Vibration and Seismic Controls for HVAC Piping and Equipment.
- B. Section 23 3300 – Air Duct Accessories: Backdraft dampers.
- C. Section 26 2726 – Wiring Devices: Electrical characteristics and wiring connections.

**1.03 REFERENCES**

- A. AMCA 99 - Standards Handbook; Air Movement and Control Association International, Inc.; 2003.
- B. AMCA 210 - Laboratory Methods of Testing Fans for Aerodynamic Performance Rating; Air Movement and Control Association International, Inc.; 1999 (ANSI/AMCA 210, same as ANSI/ASHRAE 51).
- C. AMCA (DIR) - [Directory of] Products Licensed Under AMCA International Certified Ratings Program; Air Movement and Control Association International, Inc.; <http://www.amca.org/licenses/search.aspx>.
- D. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; Air Movement and Control Association International, Inc.; 2005.
- E. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; Air Movement and Control Association International, Inc.; 2006.
- F. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association; 2006.
- G. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; National Fire Protection Association; 2004.
- H. UL 705 - Power Ventilators; Underwriters Laboratories Inc.; 2004.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Submittals, for submittal procedures.
- B. Product Data: Provide data on fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels at rated capacity, and electrical characteristics and connection requirements.
- C. Manufacturer's Instructions: Indicate installation instructions.
- D. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

**1.06 ENVIRONMENTAL REQUIREMENTS**

- A. Do not operate fans for any purpose until ductwork is clean, filters are in place, bearings have been lubricated, and fan has been test run under observation.

**1.07 EXTRA MATERIALS**

- A. See Section 01 6000 - Product Requirements, for additional provisions.
- B. Supply two sets of belts for each fan.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Loren Cook Company: [www.lorencook.com](http://www.lorencook.com).
- B. Greenheck: [www.greenheck.com](http://www.greenheck.com).
- C. PennBarry: [www.pennbarry.com](http://www.pennbarry.com).
- D. Twin City Fans.
- E. Soler & Palau.

### **2.02 IN-LINE CENTRIFUGAL FANS**

- A. Housing: Split, spun aluminum with aluminum straightening vanes, inlet and outlet flanges, and support bracket adaptable to floor, side wall, or ceiling mounting.
- B. Belt-Driven Units: Motor mounted on adjustable base, with adjustable sheaves, enclosure around belts within fan housing, and lubricating tubes from fan bearings extended to outside of fan housing.
- C. Fan Wheels: Aluminum, airfoil blades welded to aluminum hub.
- D. Accessories:
  - 1. Fan Guards: 1/2- by 1-inch (13- by 25-mm) mesh of galvanized steel in removable frame. Provide guard for inlet or outlet for units not connected to ductwork.
  - 2. Motor and Drive Cover (Belt Guard): Epoxy-coated steel.
  - 3. Vibration Isolators:
    - a. Type: Elastomeric hangers.
    - b. Static Deflection: 1 inch (25 mm).
  - 4. Spark Arrestance Class: C.

### **2.03 CABINET AND CEILING EXHAUST FANS**

- A. Centrifugal Fan Unit: Direct driven with galvanized steel housing lined with acoustic insulation, resilient mounted motor, gravity backdraft damper in discharge.
- B. Disconnect Switch: Cord and plug in housing for thermal overload protected motor and wall mounted switch where indicated.
- C. Grille: Aluminum with baked white enamel finish. (Ceiling mounted fans only)
- D. Sheaves: Cast iron or steel, dynamically balanced, bored to fit shafts and keyed; variable and adjustable pitch motor sheaves selected so required rpm is obtained with sheaves set at mid-position; fan shaft with self-aligning pre-lubricated ball bearings.

### **2.04 CENTRIFUGAL ROOF VENTILATORS**

- A. Housing: Removable, spun-aluminum, dome top and outlet baffle, square, one-piece aluminum base with venture inlet cone.
- B. Belt-Driven Units: Motor mounted on adjustable base, with adjustable sheaves, enclosure around belts within fan housing, and lubricating tubes from fan bearings extended to outside of fan housing.
- C. Fan Wheels: Aluminum hub with backward-inclined blades.
- D. Roof curbs: Galvanized steel; mitered and welded corners; 1-1/2 inch thick, rigid, fiberglass insulation adhered to inside walls and 1-1/2 inch wood nailer, size as required to suit roof opening and fan base.
  - 1. Configuration: Suitable for standing seam metal roof.
  - 2. Manufacture curb for roof slope to ensure fan sits level.

## **PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions. Provide mounting hardware.
- B. Install power ventilators level and plumb.
- C. Hung Cabinet Fans:
  - 1. Install fans with resilient mountings and flexible electrical leads. Refer to Section 23 0548.
  - 2. Install flexible connections specified in Section 23 3300 between fan and ductwork. Ensure metal bands of connectors are parallel with minimum one inch (25 mm) flex between ductwork and fan while running.
  - 3. Support suspended units from structure using threaded steel rods and spring hangers. Vibration-control devices are specified in Division 23 section "Vibration and Seismic Controls for HVAC Piping and Equipment."
- D. Provide sheaves required for final air balance.
- E. Provide backdraft dampers on outlet from cabinet and ceiling exhausters fans and as indicated.
- F. Label units according to requirements specified in Division 23 Section "Identification for HVAC Piping and Equipment."

**3.02 CONNECTIONS**

- A. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Division 23 Section "Air Duct Accessories."
- B. Install ducts adjacent to power ventilators to allow service and maintenance.
- C. Ground equipment according to Division 26 Section "Grounding and Bonding."
- D. Connect wiring according to Division 26 Section "Building Wires and Cable."

**3.03 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
  - 1. Verify that shipping, blocking, and bracing are removed.
  - 2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
  - 3. Verify that cleaning and adjusting are complete.
  - 4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
  - 5. Adjust belt tension.
  - 6. Adjust damper linkages for proper damper operation.
  - 7. Verify lubrication for bearings and other moving parts.
  - 8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
  - 9. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.
  - 10. Shut unit down and reconnect automatic temperature-control operators.
  - 11. Remove and replace malfunctioning units and retest as specified above.
- C. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Prepare test and inspection reports.

**3.04 ADJUSTING**

- A. Adjust damper linkages for proper damper operation.
- B. Adjust belt tension.
- C. Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing" for testing, adjusting, and balancing procedures.
- D. Replace fan and motor pulleys as required to achieve design airflow.
- E. Lubricate bearings.

**END OF SECTION**



**SECTION 23 3713****DIFFUSERS, REGISTERS, AND GRILLES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Diffusers.
- B. Registers/grilles.
- C. Roof caps.

**1.02 RELATED SECTIONS**

- A. Section 09 9 000 - Paints and Coatings: Painting of ducts visible behind outlets and inlets.

**1.03 REFERENCES**

- A. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; Air Movement and Control Association International, Inc.; 1999.
- B. ARI 890 - Standard for Air Diffusers and Air Diffuser Assemblies; Air-Conditioning and Refrigeration Institute; 2001.
- C. ASHRAE Std 70 - Method of Testing for Rating the Performance of Air Outlets and Inlets; American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.; 2006.
- D. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; 2005.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Submittals for submittal procedures.
- B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.
- C. Project Record Documents: Record actual locations of air outlets and inlets.

**1.05 QUALITY ASSURANCE**

- A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.
- B. Test and rate louver performance in accordance with AMCA 500-L.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Titus: [www.titus-hvac.com](http://www.titus-hvac.com).
- B. Krueger: [www.krueger-hvac.com](http://www.krueger-hvac.com).
- C. Metalaire.

**2.02 FIXED FACE BAR TYPE RETURN REGISTERS "A"**

- A. Type: Streamlined, 1/8 by 3/4 inch blades on 3/4 inch centers.
- B. Frame: 1-1/4" wide, surface mount type. In plaster ceilings, provide plaster frame and ceiling frame.
- C. Fabrication: Steel with 20 gauge minimum frames and 22 gauge minimum blades, steel with factory finish
  - 1. Accessories: Opposed blade damper with damper adjustable from diffuser face. Omit opposed blade damper in registers also serving ceiling fire dampers.

**2.04 ROOF CAPS**

- A. Fabricate air inlet or exhaust hoods in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- B. Fabricate of galvanized steel, minimum 16 gauge base and 20 gauge hood, or aluminum,

- minimum 16 gage base and 18 gage hood; suitably reinforced; with removable hood; birdscreen with 1/2 inch square mesh, and factory prime coat or baked enamel finish.
- C. Mount unit on minimum 1 1/2 inch (38 mm) high curb base with insulation between duct and curb.
  - D. Make hood outlet area minimum of twice throat area.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- C. Install diffusers to ductwork with air tight connection.
- D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.
- E. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09 9000.

**END OF SECTION**

**SECTION 23 5533  
FUEL-FIRED UNIT HEATERS**

**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. This Section includes gas-fired unit heaters.

**1.3 SUBMITTALS**

- A. Product Data: For each type of fuel-fired unit heater indicated. Include rated capacities, operating characteristics, and accessories.
- B. Shop Drawings: For fuel-fired unit heaters. Include plans, elevations, sections, details, and attachments to other work.
1. Prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of fuel-fired unit heaters, as well as procedures and diagrams.
  2. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
  3. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  4. Wiring Diagrams: Power, signal, and control wiring.
- C. Coordination Drawings: Plans, elevations, and other details, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
1. Structural members to which equipment will be attached.
  2. Items penetrating roof and the following:
    - a. Vent and gas piping rough-ins and connections.
- D. Manufacturer Seismic Qualification Certification: Submit certification that fuel-fired unit heaters, accessories, and components will withstand seismic forces defined in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment." Include the following:
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
  2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- E. Field quality-control test reports.
- F. Operation and Maintenance Data: For fuel-fired unit heaters to include in emergency, operation, and maintenance manuals.
- G. Warranty: Special warranty specified in this Section.

**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.
- B. ASHRAE/IESNA 90.1-2004 Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6 - "Heating, Ventilating, and Air-Conditioning."

**1.5 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace heat exchanger of fuel-fired unit heater that fails in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

## 1.6 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. Fan Belts: One for each belt-driven fan size.

## PART 2 - PRODUCTS

### 2.1 GAS-FIRED UNIT HEATERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Modine Manufacturing Company
  2. Reznor/Thomas & Betts Corporation.
  3. Sterling HVAC Products; Div. of Mestek Technology Inc.
- B. Description: Factory assembled, piped, and wired, and complying with ANSI Z83.8/CSA 2.6.
- C. Fuel Type: Design burner for liquefied petroleum (LP) having characteristics same as those of gas available at Project site.
- D. Type of Venting: Indoor, separated combustion, power vented.
- E. Housing: Steel, with integral draft hood and inserts for suspension mounting rods.
  1. External Casings and Cabinets: Baked enamel over corrosion-resistant-treated surface.
  2. Suspension Attachments: Reinforce suspension attachments at connection to fuel-fired unit heaters.
    - a. Seismic Fabrication Requirements: Fabricate suspension attachments of fuel-fired unit heaters, accessories mountings, and components with reinforcement strong enough to withstand seismic forces defined in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" when fuel-fired unit heater is anchored to building structure.
- F. Heat Exchanger: Stainless steel.
- G. Burner Material: Stainless steel.
- H. Unit Fan: Formed-steel propeller blades riveted to heavy-gage steel spider bolted to cast-iron hub, dynamically balanced, and resiliently mounted.
  1. Fan-Blade Guard: Galvanized steel, complying with OSHA specifications, removable for maintenance.
  2. General requirements for motors are specified in Division 23 Section "Basic Mechanical Materials and Methods."
    - a. Motors: Totally enclosed with internal thermal-overload protection and complying with Division 23 Section "Basic Mechanical Materials and Methods."
    - b. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
    - c. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 26 Sections.
- I. Unit Fan: Steel, centrifugal fan dynamically balanced and resiliently mounted.
  1. Belt-Driven Drive Assembly: Resiliently mounted to housing, with the following features:
    - a. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
    - b. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
    - c. Pulleys: Cast-iron, adjustable-pitch motor pulley.
  2. General requirements for motors are specified in Division 23 Section "Basic Mechanical Materials and Methods."
    - a. Motors: Totally enclosed with internal thermal-overload protection and complying with Division 23 Section "Basic Mechanical Materials and Methods."
    - b. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
    - c. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 26 Sections.

- J. Controls: Regulate d redundant gas valve containing pilot solenoid valve, electric gas valve, pilot filter, pressure regulator, pilot shutoff, and manual shutoff all in one body.
  - 1. Gas Control Valve: Single stage.
  - 2. Ignition: Electronically controlled electric spark with flame sensor.
  - 3. Fan Thermal Switch: Operates fan on heat-exchanger temperature.
  - 4. Vent Flow Verification: Flame rollout switch.
  - 5. Control transformer.
  - 6. High Limit: Thermal switch or fuse to stop burner.
  - 7. Thermostat: Single-stage , wall-mounting type with 50 to 90 deg F (10 to 32 deg C) operating range and fan on switch.
- K. Discharge Louvers: Independently adjustable horizontal blades.
- L. Accessories:
  - 1. Four-point suspension kit.
  - 2. Summer fan switch.
  - 3. Power Venter: Centrifugal aluminu zed-steel fan, with stainless-steel shaft; 120-V ac motor.
  - 4. Concentric, Terminal Vent Assembly: Combined combustion-air inlet and powe r-vent outlet with wall or roof caps. Include adapter assembly for connection to inlet and outlet pipes, and flashing for wall or roof penetration.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install and connect gas-fired unit heaters and associated fuel and vent features and systems according to NFPA 54, applicable lo cal codes and regulations, and manuf acturer's written installation instructions.
- B. Suspended Units: Suspend from substrate using threaded rods, spring hangers, and building attachments. Secure rod s to unit ha nger attachments. Adjust hangers so unit is level a nd plumb.
  - 1. Restrain the unit to resist code-required horizontal acceleration.

#### 3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to fuel-fired unit heater to allow service and maintenance.
- C. Gas Piping: Comply with Division 23 Section "Facility Natural-Gas Piping." Connect gas piping to gas train inlet; provide union with enough clearance for burner removal and service.
- D. Electrical Connections: Comply with applicable requirements in Division 26 Sections.
  - 1. Install electrical devices furnished with heaters but not specified to be factory mounted.

#### 3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- B. Perform tests and inspections and prepare test reports.
  - 1. Manufacturer's Field Servi ce: Engage a fa ctory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C. Tests and Inspections:
  - 1. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
  - 2. Verify bearing lubrication.
  - 3. Verify proper motor rotation.
  - 4. Test Reports: Prepare a written report to record the following:
    - a. Test procedures used.
    - b. Test results that comply with requirements.

- c. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
  - D. Remove and replace malfunctioning units and retest as specified above.
- 3.4 ADJUSTING**
  - A. Adjust initial temperature set points.
  - B. Adjust burner and other unit components for optimum heating performance and efficiency.
- 3.5 DEMONSTRATION**
  - A. Train Owner's maintenance personnel to adjust, operate, and maintain fuel-fired unit heaters. Refer to Division 01 Section "Demonstration and Training."

**END OF SECTION**

**SECTION 26 0126**  
**ELECTRICAL ACCEPTANCE AND START- UP TESTS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Acceptance and start-up testing requirements for electrical power distribution equipment and systems. Contractor shall retain and pay for the services of a recognized independent testing firm for the purpose of performing inspections and tests as herein specified.
  - 1. The testing firm shall provide all material, equipment, labor, and technical supervision to perform such tests and inspections.
  - 2. It is the purpose of these tests to assure that all tested electrical equipment is operational and within industry and manufacturers tolerances and is installed in accordance with design specifications.
  - 3. Test results and inspections shall determine suitability for start-up and energization.
  - 4. The following equipment shall be tested and calibrated:
    - a. Protective relays, instruments, and metering systems.
    - b. Grounding system and ground fault protection systems.
    - c. Low voltage cables and feeders.
    - d. Diesel generator.

**1.02 CODES, STANDARDS, AND REFERENCES**

- A. All inspections and tests shall be in accordance with the following codes and standards except as provided otherwise herein.
  - 1. National Electrical Manufacturers Association – NEMA
  - 2. American Society for Testing and Materials – ASTM
  - 3. Institute of Electrical and Electronic Engineers – IEEE
  - 4. InterNational Electrical Testing Association – NETA
    - a. Acceptance Testing Specifications – ATS latest edition.
  - 5. American National Standards Institute – ANSI Z39.21
    - a. National Electrical Safety Code.
  - 6. State and Local Codes and Ordinances.
  - 7. Insulated Cable Engineers Association – ICEA
  - 8. Occupational Safety and Health Administration – OSHA
  - 9. National Fire Protection Association – NFPA
    - a. ANSI/NFPA 70: National Electrical Code
    - b. ANSI/NFPA 78: Lightning Protection Code
    - c. ANSI/NFPA 101: Life Safety Code
- B. All inspections and tests shall utilize the following references.
  - 1. Project design specifications.
  - 2. Project design drawings.
  - 3. Manufacturers instruction manuals applicable to each particular apparatus.
  - 4. Project list of equipment to be inspected and tested.

**1.03 QUALIFICATIONS OF TESTING FIRM**

- A. The testing firm shall be an independent testing organization which can function as an unbiased testing authority, professionally independent of the manufacturers, suppliers, and installers of equipment.
- B. The testing firm shall be regularly engaged in the testing of electrical equipment devices, installations, and systems with at least five (5) years of documented experience.
- C. The testing firm shall meet OSHA criteria for accreditation of testing laboratories, or be a full member company of the InterNational Electrical Testing Association (NETA) or qualified to be a member of NETA.

- D. The lead on-site, technical person shall be currently certified by the InterNational Electrical Association (NETA) or National Institute for Certification in Engineering Technologies (NICET) in electrical power distribution system testing.
- E. The testing firm shall utilize engineers and technicians who are regularly employed by the firm for testing services.
- F. The testing firm shall submit proof of the above qualifications with bid documents when requested.
- G. The terms used herewithin, such as test agency, test contractor, testing laboratory, or contractor Test Company, shall be construed to mean the testing firm.

#### **1.04 SUBMITTAL**

- A. Provide submittal per Contract General Conditions, Division 1, and Section 26 0510.
- B. Qualification of testing firm.
- C. Certified test reports.
- D. Two copies of blank forms for checklists, test reports, and other related forms for Engineer's review and approval.

#### **1.05 GENERAL REQUIREMENTS**

- A. Routine insulation-resistance, continuity, and rotation tests for all distribution and utilization equipment shall be performed, prior to and in addition to acceptance tests specified herein.
- B. The testing firm shall notify the Engineer within 3 working days prior to commencement of any testing.
- C. Any system, material, or workmanship which is found defective on the basis of Acceptance Tests shall be reported to the Engineer with corrective recommendations.
- D. The testing firm shall maintain a written-record of all tests and, upon completion of project shall assemble and certify a final test report.
- E. Test report.

#### **1.06 SAFETY AND PRECAUTIONS**

- A. Safety practices shall include, but are not limited to the following requirements:
  - 1. Occupational Safety and Health Act.
  - 2. Accident Prevention Manual for Industrial Operations, National Safety Council.
  - 3. Applicable state and local safety operating procedures.
  - 4. Owners safety practices.
  - 5. National Fire Protection Association – NFPA 70A.
  - 6. American National Standards for Personnel Protection.
- B. All tests shall be performed with a apparatus de-energized. Exceptions must be thoroughly reviewed to identify safety hazards and devise adequate safeguards.
- C. The testing firm shall have a designated safety representative on the project to supervise the testing operations with respect to safety.
- D. Test Report:
  - 1. The test report shall include the following:
    - a. Summary of project.
    - b. Listing of equipment tested.
    - c. Test results.
    - d. Recommendations.
  - 2. Furnish copies of the complete report to the Engineer as directed in the contract documents.

#### **1.07 INSPECTION AND TEST PROCEDURES**



- A. Contractor to provide the testing firm with a copy of related contract documents such as drawings, specifications, engineer reviewed submittals, coordination study report including all relay settings and other necessary information.
- B. Contractor to supply a suitable source of power to each site per testing firm requirements.
- C. Contractor shall notify the testing firm when equipment becomes available for acceptance tests. Work shall be coordinated to expedite project scheduling.
- D. Testing firm to review and evaluate all received documents and notify Contractor and Engineer of any shortcoming documents and/or other requirements immediately.
- E. Testing firm to provide and comply with the following:
  - 1. Acceptance test procedures for each individual equipment listed on Part 1 of this section for Engineer review and approval prior to any test and after thorough evaluation of the system. Testing shall conform to the international Electrical Testing Association (NETA) specifications and standards for electrical power distribution equipment and systems and manufacturer's instructions.
  - 2. Refer to each individual specification section for testing requirements and comply.
  - 3. Inspect installed equipment and report any discrepancy and deficiency with contract documents and governing codes prior to testing.

**1.08 SYSTEM FUNCTION TEST**

- A. Perform system function test upon completion of equipment test as defined in this section. It is the purpose of system function tests to prove the proper interaction of all sensing, processing, and action devices.
- B. Implementation.
  - 1. Develop test parameters for the purpose of evaluation performance of all integral components and their functioning as a complete unit within design requirements.
  - 2. Test all interlocking devices.
  - 3. Record the operation of alarms and indicating devices.

**1.09 DEFICIENCIES**

- A. All deficiencies reported by testing firm to be corrected by Contractor and Acceptance Test to be re-done accordingly.

**END OF SECTION**

**SECTION 26 0510**  
**GENERAL ELECTRICAL REQUIREMENTS**

**PART 1 GENERAL****1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections.
- B. All Specification Sections under Division 26.

**1.02 SUMMARY**

- A. This Section includes:
  - 1. Definitions.
  - 2. Excavation.
  - 3. Coordination of work.
  - 4. Cleaning, patching repairing and painting.
  - 5. Guarantees.
  - 6. Field test.

**1.03 REFERENCES**

- A. American National Standards Institute, Inc. (ANSI) Publications:
  - 1. C2 - National Electrical Safety Code.
- B. California Code of Regulations (CCR) Publications:
  - 1. Title 8, Industrial Relations.
  - 2. Title 19, State Fire Marshal Regulations.
  - 3. Title 24, Part 2, Energy Conservation Standards.
  - 4. Title 24, Part 3, CCR, California Electrical Code.
  - 5. Title 24, Part 9, CCR, California Fire Code.
- C. National Electrical Manufacturers Association (NEMA) Publication: ICS6-93 Enclosures for Industrial Controls and Systems.
- D. National Fire Protection Association (NFPA) Publications:
  - 1. 70B Recommended Practice for Electrical Equipment Maintenance.
  - 2. NFPA 101 Life Safety Code.
- E. State of California Public Utilities Commission (Cal. P.U.C.) Publications:
  - 1. G.O. 95 Rules for Construction of Underground Electrical Supply and Communications Rules for Overhead Electric Line Construction.
  - 2. G.O. 128 Systems.

**1.04 DEFINITIONS**

- A. The following definitions apply to terms used in these standards.
  - 1. The words "work" or "electrical work" include products, labor, equipment, tools, appliances, transportation, and all related items directly or indirectly required to complete the specified and indicated electrical installation.
  - 2. The word "concealed" shall mean that the installation will not be visible when all permanent or removable elements of the construction are in place. The word "exposed" shall mean that the installation is visible when all permanent or removable elements of the construction are in place.
  - 3. The word "code" shall mean any and all regulations and requirements of regulatory bodies, public and private, having jurisdiction over the work involved.
  - 4. The word "product" used in Division 26 means all material, equipment, machinery, and/or appliances directly or indirectly required to complete the specified and/or indicated electrical work.
  - 5. The words "standard product" shall mean a manufactured product, illustrated and/or described in catalogs or brochures, that is in general distribution prior to the date of issue

of construction documents. Products will generally be identified by means of a specific catalog number and manufacturer's name.

6. "Provide" means furnish, install, connect and test unless otherwise noted.
7. The words "conduit" and "duct" are used interchangeably, and have the same meaning.
8. "UFER" Ground: See Section 26 0526, "Grounding and Bonding".

#### 1.05 DRAWINGS AND SPECIFICATIONS

- A. Electrical drawings are diagrammatic but shall be followed as closely as actual construction and work of the other sections shall permit. Size and location of equipment is drawn to scale wherever possible.
- B. Drawings and specifications are for the assistance and guidance of the Contractor. Exact locations, distances, and levels will be governed by the building. The Contractor shall make use of data in all the contract documents and verify information at the building site.
- C. In any case where there appears to be a conflict or ambiguity between that which is shown on the electrical drawings or in the electrical specifications and any other part of the Contract Documents, it shall be understood that the greater quantity or the better quality shall be used unless a written decision by the owner's representative has been obtained.
- D. Drawings and specifications are intended to complement each other. Where a conflict or ambiguity exists between the requirements of the drawings and the specifications, request clarification. Do not proceed with work without direction.
- E. The Architect shall interpret the drawings and the specifications. The interpretation by the Architect as to the true intent and meaning thereof and the quality, quantity, and sufficiency of the materials and workmanship furnished there under shall be accepted as final and conclusion.
- F. In the case of conflicts or ambiguities not clarified prior to the bidding deadline, use the most costly alternative (better quality, greater quantity, and larger size) in preparing the bid. A clarification will be issued to the successful bidder as soon as feasible after the award and, if appropriate, a deductive change order will be issued. No additional cost shall be approved for failure to use the most costly alternative in the bid.
- G. Where items are specified in the singular, this division shall provide the quantity as shown on drawings plus any spares or extras indicated on the drawings or in the specifications.
- H. RECORD DRAWINGS
  1. On one (1) set of contract drawings, kept at the site during construction, mark all work that is installed differently from that shown on plans, including revised circuitry, material or equipment. Sufficient dimensions shall be provided to locate all materials installed beneath and outside the building including, but not limited to, underground conduits, cabling, ground rods, and stubouts.
  2. All changes or revisions to the contract drawings including, but not limited to, those indicated by amendment, change order, field order, written response to RFI/RFC or other contractual means shall be kept current as the work progresses and shall be incorporated onto the final record drawings.
  3. Accurately locate and dimension all underground and embedded conduit runs on the record drawings.
  4. The marked drawings shall be kept current as the work progresses and shall be available for inspection upon request. At the close of construction, prepare a set of accurate reproducible record drawings and turn them over to the Architect. The correct and completed record drawings are a prerequisite to final contract payment.
    - a. As part of the reproducible record drawings, the Contractor shall produce full size reproducible drawings with the: Final panelboard schedules as modified during construction and final light fixture schedule as modified during construction.
    - b. These drawings shall be on Architectural base sheets and numerically sequenced to follow the last "E" sheet.
  5. As part of the reproducible record drawings, the Contractor shall produce full size

reproducible drawings for all signal systems which shall include exact "As-Built" device locations, "As-Built" interconnection drawings, and "As-Built" riser diagrams, and provide one set in the panel board, motor control center, or main distribution panel.

#### **1.06 EXAMINATION OF SITE**

- A. Examination of the building site shall be made by the Contractor. The Contractor shall compare it with the drawings and specification and satisfy himself as to the conditions under which work is to be performed. The Contractor shall, at such time, ascertain and check the locations of existing structures or equipment which may affect his work.

#### **1.07 EXCAVATION**

- A. Prior to starting excavation or trenching, the Contractor shall perform an underground Site Survey utilizing an electronic locator to verify the exact location of all existing underground utility piping, conduits and conductors. The Contractor shall submit for approval a site survey report to the Architect within five (5) working days after the survey is performed. The Site Survey Report shall show the horizontal location for existing utilities and identify any possible conflicts between the new work and existing utilities.

#### **1.08 PERMITS, FEES AND INSPECTIONS**

- A. Permits, fees, and inspections shall be arranged for and paid by the Contractor.
- B. The Contractor shall present to the Architect, properly signed certificates of the final inspection before work will be accepted.

#### **1.09 ELECTRO-MECHANICAL REQUIREMENTS**

- A. The power wiring, safety switches, combination controllers (indicated on electrical plans), circuit breakers, and motor control equipment forming a part of motor-control centers or switchgear assemblies, and the electrical connection of the mechanical equipment to the electrical power source shall be included under Division 26.
- B. The electrical components of mechanical equipment including, but not limited to, motors, motor-starters, control or pushbutton stations, float-pressure switches, solenoid valves, thermostats, junction boxes, and other devices functioning to control mechanical equipment shall be provided under Division 23. Interconnecting wiring for packaged equipment shall be provided as an integral part of the equipment.
- C. Control Wiring: Installation of line and low voltage conduit, wiring and junction/outlet boxes not shown on the electrical drawings but required for controlling or monitoring mechanical equipment systems shall be furnished and installed under Division 23. Installation of these shall comply with the requirements of Division 26.
- D. If substitution of controls or mechanical equipment other than that specified requires any changes in the electrical work from that shown on the plans or specified in Division 26, any additional cost of the equipment or electrical work shall be the responsibility of Division 23.

#### **1.10 REQUIREMENTS OF REGULATORY AGENCIES**

- A. Perform work in accordance with all pertaining status, ordinances, laws, rules, codes, regulations, standards local codes and the lawful orders of all public authorities having jurisdiction, the same as if repeated in full herein without limitations.

#### **1.11 SUBMITTALS**

- A. Submittal requirements for Division 26 shall be in accordance with Division 1 except as modified herein. All time requirements shall be based on the notice to proceed date of the General Contract. All materials and equipment furnished under Division 26 shall be submitted to the Architect for approval. Such approval shall be in writing from the Architect including that which is exactly as specified. Any materials or equipment installed without written approval shall be subject to immediate removal. Approval of material or equipment shall in no way obviate compliance with the contract documents.
- B. Submittals shall be packaged separately for each system or major piece of equipment and reviewed by the Contractor for verification of compliance with the contract documents prior to

submitting to the Architect. Separate, bound submittals shall be provided for each specification section to the Architect. All interface between specification sections shall be indicated in each submittal.

- C. All materials and equipment shall be new and shall bear the inspection label of the Underwriters Laboratories (UL) where applicable. Materials and equipment shall be the latest standard product and shall be of the grade indicated by the trade names given.
- D. The work shown on the contract drawings is engineered and designed to accommodate the equipment described hereinafter in these specifications.
- E. Equipment submittal shall include manufacturer's name, model, type, number, finish, size and capacity of the equipment at the given conditions. This information shall be provided in bound submittals, each containing an index and all submittals. Provide seven (7) copies of each submittal. The title shall provide the project name, system identity, the specification number, and the Contractor's name and address. This submittal shall be in addition to the shop drawings hereinafter specified. Partial submittals of material submitted from time to time are not acceptable and may be returned without review.
- F. Submittals shall be reviewed by the Architect for compliance with the contract documents. Submittals found to be incomplete or not in compliance with the contract documents shall be returned for re-submittal. The Architect shall review the original submittal and one (1) re-submittal per section (if required). The Contractor shall reimburse the Architect for all subsequent submittal review.
- G. Shop drawings for service entrance equipment shall be submitted to and approved by the serving utility company metering shop prior to submittal to the Architect and Plan Department.
- H. Equipment Layout Drawings: "Equipment Layout Drawings" shall be provided for each equipment room, yard or area containing equipment items furnished under Division 26. Layout drawings shall consist of a plan view of the room or area (to a ¼ inch = 1 foot – 0 inch minimum scale) showing projected outlines of all equipment, complete with dotted lines indicating all required clearances, including all clearances needed for removal or service. Location of all conduit and pull boxes shall be indicated. Drawings shall indicate any and all conflicts with other trades.
- I. All work, materials and equipment shall conform to the following standards:
  - 1. Basic Electrical Regulations, Title 24, State Building Standards, California Code of Regulations
  - 2. National Electrical Code
  - 3. Institute of Electrical and Electronic Engineers (IEEE)
  - 4. County and City Electrical Codes
  - 5. American National Standards Institute (ANSI)
  - 6. American Society for Testing and Materials Standard Tests (ASTM)
  - 7. Uniform Building Code (UBC)
  - 8. State Industrial Accident Commission (IAC)
  - 9. Insulated Power Cable Engineers Association (ICEA)
  - 10. National Electric Manufacturers Association (NEMA)
  - 11. National Fire Protection Association (NFPA)
  - 12. Occupational Safety and Health Act (OSHA)
  - 13. Underwriters' Laboratories, Inc. (UL)
  - 14. American Disabilities Act (ADA)
  - 15. National Electrical Contractors Association Standards for Construction (NECA)
  - 16. California State and Local Fire Marshal
- J. Certified Test Reports: Certified Test Reports are reports of tests conducted on previously manufactured materials or equipment identical to that proposed for use. Before delivery of materials and equipment, submit certified copies of test reports specified in the individual sections.
- K. Factory Tests: Factory Tests are tests which are required to be performed on the actual

materials or equipment proposed for use. Submit results of the tests in accordance with the requirements for laboratory test results of this contract.

- L. Operation and Maintenance Manual: Furnish an operation and maintenance manual covering the stipulated electrical systems and equipment. Seven copies of the manual, bound in the hardback binders or approved equivalent, shall be provided to the Owner's Representative. Furnish one complete manual prior to the time that system or equipment tests are performed. Furnish the remaining manuals before the contract is completed. The manual shall be complete in all respects for all equipment, controls, accessories, and appurtenances stipulated. All wiring diagrams shall specifically cover the installed system indicating zones, spare zones and spare capacity, wiring, and components added to the system. Typical drawings will not be accepted.
- M. Special Submissions:
  - 1. Test reports for the following:
    - a. Ground fault devices.
    - b. Megger Readings: Ground system, motors, feeders, switchboards, motor control centers and switchgear.
    - c. Voltage Readings: Distribution, service, motors, and transformers.
    - d. High Voltage switchgear and unit substations.
    - e. Fire Alarm System.
    - f. Power system testing by independent electrical testing laboratory.
    - g. Emergency generator
  - 2. A system short circuit on the normal and emergency systems based on available fault symmetrical current as indicated on drawings at high voltage service and emergency generator, calculated by the per unit method or in accordance with the latest Institute Electrical and Electronics Engineers, Inc. (IEEE) recommendations. Reports shall be submitted in copies bound with a stiff cover and shall indicate calculated fault values and equipment ampere interrupting capacities (AIC) for each equipment including downstream panelboards, elevator controllers, dimmer banks, motor control centers, package equipment specified under Division 15, and individual feeder loads. AIC ratings shall be a minimum of 110% of calculated fault values. Reports shall include actual lengths and materials for each feeder per installing Contractor. It shall also include a tabular comparison of equipment withstand and AIC ratings, and calculated fault current at each equipment.

#### 1.12 INCOMING SERVICE

- A. Every effort has been made to determine as accurately as possible the requirements of the electrical and communication services. However, before submitting his bid, the Contractor shall verify the locations shown on the plans and shall include sufficient funds for materials and labor for extensions of lines to service locations which are acceptable to the Owner, etc. In addition, all costs levied by the Owner or any other work which is required for electrical, signal and telephone service to the project must be included, at no additional cost to the Owner.
- B. Before any work is started on these facilities, verify all electrical, civil, architectural, and structural, dimensional and other requirements related to these facilities with the Owner, and examine the site, and its conditions and include for them in bid. No exception to this shall be permitted, and there shall be no cost to Owner should Contractor not take into account the existing site conditions.
- C. Should any major changes to the work indicated be necessary to comply with the service requirements, notify the Architect at once and cease all work affected until approval for required modifications has been obtained from the Architect.
- D. Within five days after award of Contract, notify Owner that the project is under construction and furnish them the dates on which the various services will be required. Coordinate with adequate notice, outages required for incoming services to the project.

#### 1.13 SUBSTITUTIONS

- A. Equipment submitted for substitution must fit the space conditions shown on the drawings,

leaving adequate room for maintenance around all equipment. A minimum of 48 inches (or more if required by Code) must be maintained clear in front of all electrical panels, starters, gutters or other electrical apparatus. Submit drawings showing the layout, size, and exact method of interconnection of conduit, wiring and controls, which shall conform to the manufacturer's recommendations and these specifications. The scale of these drawings shall be the scale of the contract drawings. The Contractor shall bear the excess costs, by any and all crafts, for fitting the equipment into the space and the system designated. Where additional labor or material is required to permit equipment submitted for substitution to function in an approved manner, this shall be furnished and installed by the Contractor without additional cost to the Owner.

- B. No substitutions will be allowed for materials or equipment if three (3) or more manufacturers are indicated. No substitutions will be allowed if not submitted within 30 days after notice to proceed.
- C. An item submitted for substitution does not constitute an "equal" unless approval by the Architect has been given in writing.
- D. Equipment submitted for substitution shall be approved in writing by the Architect and shall be accompanied by the following:
  - 1. A sample of each item submitted for substitution shall accompany the submittal if requested by the Architect.
  - 2. A unit price quotation shall be provided with each item intended for substitution. This quote shall include a unit price for the specified item and a unit price for the intended substitute item. The Contractor shall also provide a total (per item) of the differential payback to the Owner should the intended substitute item be approved as equivalent to that which is specified.
  - 3. The Contractor shall reimburse the Owner for the additional services required by the Architect to review and process substitutions.
- E. Substitutions shall be approved in writing by the Architect. The determination of the Architect shall be final.

#### 1.14 WARRANTY

- A. Warranty requirements for Division 26 shall be in accordance with Division 1 except as modified herein.
- B. All materials and equipment provided shall be warranted for a minimum period of one (1)-year from the official date of completion. In addition, provide two (2)-year extended warranty, for a total of three (3)-years, for the following items:
  - 1. Distribution Switchboards.
  - 2. Disconnect Switches.
  - 3. Panelboards.
  - 4. Circuit Breakers.
- C. The Contractor shall provide all labor and materials required to correct problems which develop during the warranty period due to defective materials or faulty workmanship. The labor and materials to do this work shall be provided at no additional cost to the Owner.
- D. Within one (1)-month prior to the expiration of the warranty period, the Contractor shall correct any and all defects covered by the warranty. This shall include tightening to original specifications of all bolted connections.
- E. Warranty certificates shall be made out to Owner and shall be delivered to the Architect at the completion of the installation.
- F. All equipment shall be guaranteed to be supported in such a way as to be free from objectionable vibration and noise.

#### 1.15 OPERATION AND MAINTENANCE MANUALS

- A. The Contractor shall furnish operation and maintenance manuals for each electrical system and for each piece of equipment. The complete manual, bound in hardback binders, or an

approved equivalent, shall be provided to the Architect. Provide Seven (7) copies of each manual. One (1) manual shall be furnished prior to the time that system or equipment tests are performed, and the remaining manuals shall be furnished one (1) week before the final job visit is made. The following identification shall be inscribed on the cover; the words "OPERATION AND MAINTENANCE MANUAL", the name and location of the building, the name of the Contractor, and the contract number.

- B. The manual shall include the names, address, and the telephone numbers of each Subcontractor installing equipment and systems, and of the local representatives for each item of equipment and each system. The manual shall have a table of contents and be assembled to conform to the table of contents with tab sheets placed before instructions covering each subject. The instruction sheet shall be legible with large sheets of drawings folded in. The Manual shall include, but not limited to, the following:
1. System layout showing components.
  2. Devices and controls.
  3. Wiring and control diagrams showing operation and control of each component.
  4. Sequence of operation describing start-up, operation, and shutdown.
  5. Functional description of the principal system components.
  6. Installation instructions.
  7. Maintenance and overhaul instructions.
  8. Lubrication schedule including type, grade, temperature, range, and frequency.
  9. Safety precautions, diagrams and illustrations.
  10. Test procedures.
  11. Performance data.
  12. Parts list.
- C. The parts list for equipment shall indicate the sources of supply, recommended spare parts, and the service organization which is reasonably convenient to the building sit. The manual shall be complete in all respects for all equipment, controls, and accessories provided.

#### 1.16 COORDINATION OF ALL WORK

- A. Job Visits by the Architect:
1. Periodic visits to the job by the Architect are for the express purpose of verifying compliance with the contract documents.
  2. Such visits shall not be construed as construction supervision. Neither shall such visits be construed as making the Architect responsible for providing a safe place for the performance of the work by the Contractor or the Contractor's employees or the safety of the supplies of the Contractor or his Subcontractors.
- B. Temporary Electrical Service:
1. The Contractor shall provide labor and materials required for the installation and maintenance of temporary lighting and required power sources for the Contractor's equipment inside the building or construction site and for pedestrian walkways during the period of construction.
  2. The building or construction site shall be sufficiently illuminated so that construction work can be safely performed. Special attention shall be given to adequately lighting stairs, ladders, pedestrian walkways, floor openings, etc. Walkway lights shall be controlled by a switch within the building or construction site.
  3. Power shall be on and all lighting shall be in operation before painting work commences.
- C. Posted Operating Instructions:
1. Operating instructions shall be provided by the Contractor at the conclusion of the project for each system and each principal piece of equipment for the use of operating and maintenance personnel. The operating instructions shall include wiring and control diagrams showing the entire system, including, but not limited to, equipment, devices, and control sequences. All operating instruction shall be approved by the Architect.
  2. Operating instructions shall be typewritten or engraved and shall be framed under glass or in approved laminated plastic and posted adjacent to each principal piece of equipment



and shall include such instructions as start up, proper adjustment, operation, lubrication, shutdown, safety-precautions, procedure in the event of equipment failure, and any other necessary items of instructions as recommended by the manufacturer of unit.

3. Operating instructions exposed to the weather shall be made of weather-resisting materials or shall be suitably enclosed to be weather protected. Operating instructions shall not face when exposed to sunlight and shall be secured to prevent easy removal or peeling.

#### **1.17 TRAINING**

- A. User staff and maintenance personnel shall be thoroughly trained (minimum four (4)-hours) in the use of each system or major piece of equipment installed. This training shall be provided a part of the Contractors bid to supply the system or equipment.

#### **1.18 DELIVERY AND STORAGE**

- A. Equipment and materials shall be properly stored, adequately protected, and carefully handled to prevent damage before and during installation. Equipment and materials shall be handled, stored, and protected in accordance with the manufacturer's recommendations and as approved by the Architect. Electrical conduit shall be stored to provide protection from the weather and accidental damage. Plastic conduit shall be stored on even supports and in locations not subject to direct sunrays or excessive heat. Cables shall be sealed, stored, and handled carefully to avoid damage to the outer covering or insulation and damage from moisture and weather. Damaged or defective items shall be replaced with new items a no cost to the Owner. The Architect shall determine if a damaged or defective item is to be replaced with a new item. The decisions by the Architect in these matters shall be final.

**END OF SECTION**

**SECTION 26 0519**  
**BUILDING WIRES AND CABLE**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Wire and cable for 600 volts and less.
- B. Wiring connectors and connections.

**1.02 RELATED SECTIONS**

- A. Section 31 2316 - Excavation.
- B. Section 31 2323 - Fill and Backfill: Bedding and backfilling.
- C. Section 26 0553 – Identification for Electrical Systems.

**1.03 REFERENCES**

- A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2010.
- B. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; 2003.
- C. NFPA 70 - National Electrical Code; National Fire Protection Association; 2014.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Submittals, for submittal procedures.
- B. Product Data: Provide for each cable assembly type.
- C. Test Reports: Indicate procedures and values obtained.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency.
- E. Project Record Documents: Record actual locations of components and circuits.

**1.05 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience and with service facilities within 100 miles (160 km) of Project.
- C. Products: Furnish products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

**PART 2 PRODUCTS****2.01 WIRING REQUIREMENTS**

- A. Concealed Dry Interior Locations: Use only building wire in raceway or nonmetallic-sheathed cable.
- B. Exposed Dry Interior Locations: Use only building wire in raceway.
- C. Above Accessible Ceilings: Use only building wire in raceway.
- D. Wet or Damp Interior Locations: Use only building wire in raceway.
- E. Exterior Locations: Use only building wire in raceway, direct burial cable, or service-entrance cable.
- F. Underground Installations: Use only building wire in raceway, direct burial cable, or service-entrance cable.
- G. Use solid conductor for feeders and branch circuits 10 AWG and smaller.
- H. Use stranded conductors for control circuits.
- I. Use conductor not smaller than 12 AWG for power and lighting circuits.

- J. Use conductor not smaller than 16 AWG for control circuits.
- K. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet (25 m).
- L. Use 10 AWG conductors for 20 ampere, 277 volt branch circuits longer than 200 feet (60 m).
- M. Conductor sizes are based on copper.

## **2.02 BUILDING WIRE**

- A. Description: Single conductor insulated wire.
- B. Conductor: Copper.
  - 1. For Sizes Smaller Than 4 AWG: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: NFPA 70, Type THHN/THWN or Type XHHW.
  - 1. For Feeders and Branch Circuits Smaller Than 4 AWG: Type THHN/THWN or XHHW.
  - 2. For Feeders and Branch Circuits Larger Than 4 AWG and larger: Type TW.
- E. Insulation: Thermoplastic material rated 75 degrees C.

## **2.03 SERVICE ENTRANCE CABLE**

- A. Description: NFPA 70, Type USE.
- B. Conductor: Copper.
  - 1. For Sizes Smaller Than 4 AWG: Copper.
  - 2. For Sizes 4 AWG and Larger: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: Type XHHW.

## **2.04 WIRING CONNECTORS**

- A. Factory fabricated wiring connectors of size, ampacity rating, material, type, and class for application and service indicated. Furnish products listed and classified by testing firm acceptable to the authority having jurisdiction.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that interior of building has been protected from weather.
- B. Verify that mechanical work likely to damage wire and cable has been completed.
- C. Verify that raceway installation is complete and supported.
- D. Verify that field measurements are as indicated.

### **3.02 PREPARATION**

- A. Completely and thoroughly swab raceway before installing wire.

### **3.03 INSTALLATION**

- A. Install wire and cable securely, in a neat and workmanlike manner, as specified in NECA
- B. Route wire and cable as required to meet project conditions.
  - 1. Wire and cable routing indicated is approximate unless dimensioned.
  - 2. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.
  - 3. Include wire and cable of lengths required to install connected devices within 10 ft (3000 mm) of location shown.
- C. Use wiring methods indicated.
- D. Pull all conductors into raceway at same time.
- E. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
- F. Protect exposed cable from damage.

- G. Support cables above accessible ceiling, using plastic cable ties to support cables from structure or ceiling suspension system. Do not rest cable on ceiling panels.
- H. Use suitable cable fittings and connectors.
- I. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- J. Clean conductor surfaces before installing lugs and connectors.
- K. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- L. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- M. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
- N. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- O. Identify and color code wire and cable under provisions of Section 26 0553. Identify each conductor with its circuit number or other designation indicated.

**3.04 FIELD QUALITY CONTROL**

- A. Inspect and test in accordance with NETA STD ATS, except Section 4.
- B. Perform inspections and tests listed in NETA STD ATS, Section 7.3.2.

**END OF SECTION**

**SECTION 26 0526  
GROUNDING AND BONDING**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Grounding and bonding components.
- B. Provide all components necessary to complete the grounding system(s) consisting of:
  - 1. Existing metal underground water pipe.
  - 2. Metal underground water pipe.
  - 3. Metal frame of the building.
  - 4. Steel water storage tank and supports.
  - 5. Concrete-encased electrode.
  - 6. Existing metal underground gas piping system.
  - 7. Metal underground gas piping system.
  - 8. Rod electrodes.
  - 9. Plate electrodes.

**1.02 RELATED SECTIONS**

- A. Section 03 3000 - Cast-in-Place Concrete.

**1.03 REFERENCES**

- A. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; 2003.
- B. NFPA 70 - National Electrical Code; National Fire Protection Association; 2014.

**1.04 PERFORMANCE REQUIREMENTS**

- A. Grounding System Resistance: 25 ohms.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Submittals for submittals procedures.
- B. Product Data: Provide for grounding electrodes and connections.
- C. Test Reports: Indicate overall resistance to ground.
- D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Quality Assurance. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Project Record Documents: Record actual locations of components and grounding electrodes.
- F. Certificate of Compliance: Indicate approval of installation by authority having jurisdiction.

**1.06 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Products: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Cooper Power Systems: [www.cooperpower.com](http://www.cooperpower.com).
- B. Framatome Connectors International: [www.fciconnect.com](http://www.fciconnect.com).
- C. Lightning Master Corporation: [www.lightningmaster.com](http://www.lightningmaster.com).

**2.02 ELECTRODES**

- A. Manufacturers:

1. Cooper Power Systems: [www.cooperpower.com](http://www.cooperpower.com).
  2. Framatome Connectors International: [www.fciconnect.com](http://www.fciconnect.com).
  3. Lightning Master Corporation: [www.lightningmaster.com](http://www.lightningmaster.com).
  4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Rod Electrodes: Copper-clad steel.
1. Diameter: 3/4 inch (19 mm).
  2. Length: 10 feet (3000 mm).
- C. Foundation Electrodes: 2/0 AWG.

### **2.03 CONNECTORS AND ACCESSORIES**

- A. Mechanical Connectors: Bronze.
- B. Exothermic Connections: Cadweld.
- C. Wire: Stranded copper.
- D. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.
- E. Grounding Well:
1. Well Pipe: 8 inch (200 mm) by 24 inch (600 mm) long clay tile or concrete pipe with belled end.
  2. Well Cover: Cast iron with legend "GROUND" embossed on cover.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions prior to beginning work.
- B. Verify that final backfill and compaction has been completed before driving rod electrodes.

### **3.02 INSTALLATION**

- A. Install ground electrodes at locations indicated. Install additional rod electrodes as required to achieve specified resistance to ground.
- B. Provide grounding well pipe with cover at rod locations where indicated. Install well pipe top flush with finished grade.
- C. Install 4 AWG bare copper wire in foundation footing.
- D. Provide grounding electrode conductor and connect to reinforcing steel in foundation footing. Bond steel together.
- E. Provide bonding to meet requirements described in Quality Assurance.
- F. Bond together metal siding not attached to grounded structure; bond to ground.
- G. Bond together reinforcing steel and metal accessories in pool and fountain structures.
- H. Install ground grid under access floors. Construct grid of 2 AWG bare copper wire installed on 24 inch centers both ways. Bond each access floor pedestal to grid.
- I. Bond together each metallic raceway, pipe, duct and other metal object entering space under access floors. Bond to underfloor ground grid. Use 2 AWG bare copper conductor.
- J. Provide isolated grounding conductor for circuits supplying electronic cash registers, personal computers, and all other electronic equipment.
- K. Provide grounding and bonding in patient care areas to meet requirements of NFPA 99 and NFPA 70.
- L. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

### **3.03 FIELD QUALITY CONTROL**

- A. Inspect and test in accordance with NETA STD ATS except Section 4.
- B. Perform inspections and tests listed in NETA STD ATS, Section 7.13.

**SECTION 26 0529  
HANGERS AND SUPPORTS**

**PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. This Section includes the following:
1. Hangers and supports for electrical equipment and systems.
  2. Construction requirements for concrete bases.

**1.03 DEFINITIONS**

- A. EMT: Electrical metallic tubing.  
B. IMC: Intermediate metal conduit.  
C. RMC: Rigid metal conduit.

**1.04 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of [five] <Insert number> times the applied force.

**1.05 SUBMITTALS**

- A. Product Data: For the following:
1. Steel slotted support systems.
  2. Nonmetallic slotted support systems.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following:
1. Trapeze hangers. Include Product Data for components.
  2. Steel slotted channel systems. Include Product Data for components.
  3. Nonmetallic slotted channel systems. Include Product Data for components.
  4. Equipment supports.
- C. Welding certificates.

**1.06 QUALITY ASSURANCE**

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.

**1.07 COORDINATION**

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

**PART 2 - PRODUCTS****2.01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS**

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
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. Allied Tube & Conduit.
    - b. Cooper B-Line, Inc.; a division of Cooper Industries.
    - c. ERICO International Corporation.
    - d. GS Metals Corp.
    - e. Thomas & Betts Corporation.
    - f. Unistrut; Tyco International, Ltd.
    - g. Wesanco, Inc.
  3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
  4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
  5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
  6. Channel Dimensions: Selected for applicable load criteria.
- B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- (14-mm-) diameter holes at a maximum of 8 inches (200 mm) on center, in at least 1 surface.
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. Allied Tube & Conduit.
    - b. Cooper B-Line, Inc.; a division of Cooper Industries.
    - c. Fabco Plastics Wholesale Limited.
    - d. Seasafe, Inc.
  3. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
  4. Fitting and Accessory Materials: Same as channels and angles, except metal items may be stainless steel.
  5. Rated Strength: Selected to suit applicable load criteria.
- C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- D. Conduit and Cable Support Devices: Steel, Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.



- 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) Hilti Inc.
    - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
    - 3) MKT Fastening, LLC.
    - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated or stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
- 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) Cooper B-Line, Inc.; a division of Cooper Industries.
    - 2) Empire Tool and Manufacturing Co., Inc.
    - 3) Hilti Inc.
    - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
    - 5) MKT Fastening, LLC.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

## 2.02 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

## PART 3 - EXECUTION

### 3.01 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
  - 1. Secure raceways and cables to these supports with single-bolt conduit clamps or single-bolt conduit clamps using spring friction action for retention in support channel.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

### 3.02 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
  - 1. To Wood: Fasten with lag screws or through bolts.
  - 2. To New Concrete: Bolt to concrete inserts.
  - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  - 4. To Existing Concrete: Expansion anchor fasteners.
  - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
  - 6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
  - 7. To Light Steel: Sheet metal screws.
  - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

### 3.03 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

### 3.04 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 03 Section "Cast-in-Place Concrete."
- C. Anchor equipment to concrete base.
  - 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
  - 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

**3.05 PAINTING**

- A. Touchup: 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.
  - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).
- B. Touchup: Comply with requirements in Division 09 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

**END OF SECTION**

**SECTION 26 0533**  
**RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS**

**PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. Related Sections include the following:
  - 1. Division 26 Section "Underground Ducts and Raceways" for exterior ductbanks, manholes, and underground utility construction.

**1.03 DEFINITIONS**

- A. EMT: Electrical metallic tubing.
- B. ENT: Electrical nonmetallic tubing.
- C. EPDM: Ethylene-propylene-diene terpolymer rubber.
- D. FMC: Flexible metal conduit.
- E. IMC: Intermediate metal conduit.
- F. LFMC: Liquidtight flexible metal conduit.
- G. LFNC: Liquidtight flexible nonmetallic conduit.
- H. NBR: Acrylonitrile-butadiene rubber.
- I. RMC: Rigid metallic conduit.
- J. RNC: Rigid nonmetallic conduit.

**1.04 SUBMITTALS**

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Custom enclosures and cabinets.
  - 2. For handholes and boxes for underground wiring, including the following:
    - a. Duct entry provisions, including locations and duct sizes.
    - b. Frame and cover design.
    - c. Grounding details.
    - d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
    - e. Joint details.
- C. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
  - 1. Structural members in the paths of conduit groups with common supports.
  - 2. HVAC and plumbing items and architectural features in the paths of conduit groups with common supports.
- D. Qualification Data: For professional engineer and testing agency.
- E. Source quality-control test reports.

**1.05 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.

- B. Comply with NFPA 70.

## **PART 2 - PRODUCTS**

### **2.01 METAL CONDUIT AND TUBING**

- 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. AFC Cable Systems, Inc.
  - 2. Alflex Inc.
  - 3. Allied Tube & Conduit; a Tyco International Ltd. Co.
  - 4. Anamet Electrical, Inc.; Anaconda Metal Hose.
  - 5. Electri-Flex Co.
  - 6. Manhattan/CDT/Cole-Flex.
  - 7. Maverick Tube Corporation.
  - 8. O-Z Gedney; a unit of General Signal.
  - 9. Wheatland Tube Company.
- C. Rigid Steel Conduit: ANSI C80.1.
- D. Aluminum Rigid Conduit: ANSI C80.5.
- E. IMC: ANSI C80.6.
- F. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
  - 1. Comply with NEMA RN 1.
  - 2. Coating Thickness: 0.040 inch (1 mm), minimum.
- G. EMT: ANSI C80.3.
- H. FMC: Zinc-coated steel.
- I. LFMC: Flexible steel conduit with PVC jacket.
- J. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
  - 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
  - 2. Fittings for EMT: Steel, compression type.
  - 3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.
- K. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

### **2.02 NONMETALLIC CONDUIT AND TUBING**

- 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. AFC Cable Systems, Inc.
  - 2. Anamet Electrical, Inc.; Anaconda Metal Hose.
  - 3. Arnco Corporation.
  - 4. CANTEX Inc.
  - 5. CertainTeed Corp.; Pipe & Plastics Group.
  - 6. Condux International, Inc.
  - 7. ElecSYS, Inc.
  - 8. Electri-Flex Co.
  - 9. Lamson & Sessions; Carlon Electrical Products.

10. Manhattan/CDT/Cole-Flex.
  11. RACO; a Hubbell Company.
  12. Thomas & Betts Corporation.
- C. ENT: NEMA TC 13.
- D. RNC: NEMA TC 2, Type EPC-40-PVC, Type EPC-80-PVC when exposed to physical damage.
- E. LFNC: UL 1660.
- F. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.
- G. Fittings for LFNC: UL 514B.

#### **2.03 OPTICAL FIBER/COMMUNICATIONS CABLE RACEWAY AND FITTINGS**

- 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. Arnco Corporation.
  2. Endot Industries Inc.
  3. IPEX Inc.
  4. Lamson & Sessions; Carlon Electrical Products.
- C. Description: Comply with UL 2024; flexible type, approved for plenum installation.

#### **2.04 METAL WIREWAYS**

- 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. Cooper B-Line, Inc.
  2. Hoffman.
  3. Square D; Schneider Electric.
- C. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1 or 3R, unless otherwise indicated.
- D. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- E. Wireway Covers: Screw-cover type.
- F. Finish: Manufacturer's standard enamel finish.

#### **2.05 NONMETALLIC WIREWAYS**

- 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. Hoffman.
  2. Lamson & Sessions; Carlon Electrical Products.
- C. Description: Fiberglass polyester, extruded and fabricated to size and shape indicated, with no holes or knockouts. Cover is gasketed with oil-resistant gasket material and fastened with captive screws treated for corrosion resistance. Connections are flanged, with stainless-steel screws and oil-resistant gaskets.
- D. Description: PVC plastic, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.

- E. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

## 2.06 SURFACE RACEWAYS

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.
  - 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. Thomas & Betts Corporation.
    - b. Walker Systems, Inc.; Wiremold Company (The).
    - c. Wiremold Company (The); Electrical Sales Division.
- B. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC with texture and color selected by Architect from manufacturer's standard colors.
  - 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. Butler Manufacturing Company; Walker Division.
    - b. Enduro Systems, Inc.; Composite Products Division.
    - c. Hubbell Incorporated; Wiring Device-Kellems Division.
    - d. Lamson & Sessions; Carlon Electrical Products.
    - e. Panduit Corp.
    - f. Walker Systems, Inc.; Wiremold Company (The).
    - g. Wiremold Company (The); Electrical Sales Division.

## 2.07 BOXES, ENCLOSURES, AND CABINETS

- 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. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
  - 2. EGS/Appleton Electric.
  - 3. Erickson Electrical Equipment Company.
  - 4. Hoffman.
  - 5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
  - 6. O-Z/Gedney; a unit of General Signal.
  - 7. RACO; a Hubbell Company.
  - 8. Robroy Industries, Inc.; Enclosure Division.
  - 9. Scott Fetzer Co.; Adalet Division.
  - 10. Spring City Electrical Manufacturing Company.
  - 11. Thomas & Betts Corporation.
  - 12. Walker Systems, Inc.; Wiremold Company (The).
  - 13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.
- C. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- D. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- E. Nonmetallic Outlet and Device Boxes: NEMA OS 2.
- F. Metal Floor Boxes: Cast metal, semi-adjustable, rectangular.
- G. Nonmetallic Floor Boxes: Nonadjustable, round.

- H. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- I. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.
- J. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
  - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
  - 2. Nonmetallic Enclosures: Plastic.
- K. Cabinets:
  - 1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
  - 2. Hinged door in front cover with flush latch and concealed hinge.
  - 3. Key latch to match panelboards.
  - 4. Metal barriers to separate wiring of different systems and voltage.
  - 5. Accessory feet where required for freestanding equipment.

## 2.08 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

- A. Description: Comply with SCTE 77.
  - 1. Color of Frame and Cover: Gray.
  - 2. Configuration: Units shall be designed for flush burial and have open bottom, unless otherwise indicated.
  - 3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
  - 4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
  - 5. Cover Legend: Molded lettering, as required for each service.
  - 6. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
  - 7. Handholes 12 inches wide by 24 inches long (300 mm wide by 600 mm long) and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.
- B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel or fiberglass or a combination of the two.
  - 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:
  - 3. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
    - a. Armorcast Products Company.
    - b. Carson Industries LLC.
    - c. CDR Systems Corporation.
    - d. NewBasis.

## 2.09 SLEEVES FOR RACEWAYS

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch (1.3- or 3.5-mm) thickness as indicated and of length to suit application.

## 2.10 SLEEVE SEALS

- 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:
- C. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
  - 1. Advance Products & Systems, Inc.
  - 2. Calpico, Inc.
  - 3. Metraflex Co.
  - 4. Pipeline Seal and Insulator, Inc.
- D. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
  - 1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
  - 2. Pressure Plates: Stainless steel. Include two for each sealing element.
  - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

### 2.11 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

- A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.
  - 1. Tests of materials shall be performed by a independent testing agency.
  - 2. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
  - 3. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

## PART 3 - EXECUTION

### 3.01 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
  - 1. Exposed Conduit: RMC.
  - 2. Concealed Conduit, Aboveground: EMT.
  - 3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried with markings for underground and sunlight use.
  - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
  - 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
  - 6. Application of Handholes and Boxes for Underground Wiring:
    - a. Handholes and Pull Boxes in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.
    - b. Handholes and Pull Boxes in Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Polymer-concrete units, SCTE 77, Tier 8 structural load rating.
    - c. Handholes and Pull Boxes Subject to Light-Duty Pedestrian Traffic Only: Fiberglass-reinforced polyester resin, structurally tested according to SCTE 77 with 3000-lbf (13 345-N) vertical loading.
- B. Comply with the following indoor applications, unless otherwise indicated:
  - 1. Exposed, Not Subject to Physical Damage: EMT.
  - 2. Exposed, Not Subject to Severe Physical Damage: RMC identified for such use.
  - 3. Exposed and Subject to Severe Physical Damage: RMC. Includes raceways in the following locations:
    - a. Loading dock.
    - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
    - c. Mechanical rooms.

- d. Vehicle apparatus bays.
  - 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
  - 5. Connection to final connections to lighting equipment, Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations. No more than 6' in length with anti-short bushings installed at each connector prior to installing the conductors.
  - 6. Damp or Wet Locations: RMC.
  - 7. Raceways for Optical Fiber or Communications Cable in Spaces Used for Environmental Air: EMT.
  - 8. Raceways for Optical Fiber or Communications Cable Risers in Vertical Shafts: EMT.
  - 9. Raceways for Concealed General Purpose Distribution of Optical Fiber or Communications Cable: EMT.
  - 10. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch (21-mm) trade size.
  - D. Raceway Fittings: Compatible with raceways and suitable for use and location.
    - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
    - 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.
  - E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.
  - F. Do not install aluminum conduits in contact with concrete.

### 3.02 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 26 Section "Hangers and Supports."
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
- H. Raceways Embedded in Slabs:
  - 1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
  - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
  - 3. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above the floor.
- I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.

- L. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:
  - 1. 3/4-Inch (19-mm) Trade Size and Smaller: Install raceways in maximum lengths of 50 feet (15 m).
  - 2. 1-Inch (25-mm) Trade Size and Larger: Install raceways in maximum lengths of 75 feet (23 m).
  - 3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
- M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
  - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  - 2. Where otherwise required by NFPA 70.
- N. Flexible Conduit Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
  - 1. Use LFMC in damp or wet locations subject to severe physical damage.
  - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- O. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
- P. Set metal floor boxes level and flush with finished floor surface.
- Q. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

### 3.03 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
  - 1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Section 31 2316 "Excavation" for pipe less than 6 inches (150 mm) in nominal diameter.
  - 2. Install backfill as specified in Section 31 2323 "Fill and Backfill."
  - 3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Section 31 2323, "Fill and Backfill."
  - 4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
  - 5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.
    - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete.
    - b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.
  - 6. Warning Planks: Bury warning planks approximately 12 inches (300 mm) above direct-buried conduits, placing them 24 inches (600 mm) o.c. Align planks along the width and along the centerline of conduit.

**3.04 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES**

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch (25 mm) above finished grade.
- D. Install handholes and boxes with bottom below the frost line, below grade.
- E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.
- F. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

**3.05 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS**

- A. Concrete Slabs and Walls: Install galvanized steel sleeves for penetrations through poured concrete or CMU walls with a minimum of one (1) inch annular space.
- B. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- C. Rectangular Sleeve Minimum Metal Thickness:
  - 1. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side greater than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
  - 2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches (1270 mm) and 1 or more sides equal to, or greater than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.
- G. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway unless sleeve seal is to be installed.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealers" for materials and installation.
- J. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.
- K. Aboveground, Exterior-Wall Penetrations: Seal penetrations using galvanized sheet metal sleeves and fire sealed in accordance with standard fire sealing practices. COR 16110-3.4.
- L. Underground, Exterior-Wall Penetrations or foundations: Install galvanized RMC with segmented link seals at exterior building penetrations.

**3.06 SLEEVE-SEAL INSTALLATION**

- A. Install to seal underground, exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install

in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

**3.07 PROTECTION**

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
  - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  - 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

**END OF SECTION 26 0533**

**SECTION 26 0534**  
**OUTLET, PULL AND JUNCTION BOXES**

**PART 1 GENERAL****1.01 RELATED DOCUMENTS**

- A. Provisions of Section 26 0510, "General Electrical Requirements".

**1.02 REFERENCES**

- A. National Electrical Manufacturers Association.
- B. American Society for Testing and Materials.
- C. National Electrical Code

**1.03 SUMMARY**

- A. Outlet Boxes.
- B. Pull Boxes.
- C. Junction Boxes.
- D. Floor Boxes.

**1.04 WARRANTY:**

- A. Warranty shall comply with the provisions of Section 26 0510, "General Electrical Requirements".

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. The size of each outlet or junction box shall be determined by the number and sizes of wires and conduits entering the box, but shall be not less than 4-inch square and 2-1/8-inches deep unless otherwise indicated.
- B. Outlet and junction boxes for interior use shall be galvanized or sherardized, one-piece pressed or welded steel, knockout type, except where other types of boxes are indicated or specified.
- C. Outlet and junction boxes for exterior use shall be lug type "Bell" boxes "250L" through "254L", "Crouse-Hinds FS" type, as applicable or equal.
- D. Outlet boxes shall be equipped with plaster rings, inserts and fixture studs as may be required. Knockout seals shall be provided where knockouts are not intact.
- E. Plastic, fiber or composition boxes shall not be permitted.
- F. Telecommunication Outlets: Voice and data wall outlet boxes shall be 4-11/16-inch square by 2-1/8-inch deep metal boxes, with plaster ring.
- G. Outlet boxes for hazardous locations (Class I, Groups A, B, C, and D; and Class II, groups D, F and G) shall be in accordance with U.L. 886.
- H. All exterior pull boxes, plates, fittings, etc., mounted below 10 feet – 0 inch in height shall be fitted with rust proof, tamperproof screws. Provide Owner with two (2) screw drivers (or wrenches) to fit special screws. Screws shall be Spanner, Key Slot, or Rosette.
- I. Boxes in concrete shall be of the type to allow placing of conduit without displacing reinforcing bars, and shall be type approved for concrete use. Boxes installed in poured concrete shall be packed with approved material to prevent concrete entering box. Do not use paper for such packing.
- J. Floor boxes shall be Walker Box Resource RFB or equal, no known equal series with brass plates and brass carpet flanges for carpeted areas.

**PART 3 EXECUTION****3.01 INSTALLATION**

- A. Outlet boxes shall be securely and independently fastened to the structure and in concealed work shall be supported flush with finished surface of walls or ceiling.
- B. Bar hangers fitted with fixture studs shall be used to support and outlet boxes in stud partitions and in furred or plastered ceilings.
- C. Fasteners shall be machine screws, nut and lock washers in metal, wood screws, in wood, or expansion shields or inserts in masonry or concrete. Wooden inserts will not be acceptable.
- D. Label outside of box to identify panel and circuit numbers. Use indelible markers, non-erasing type, for boxes above ceilings or in concealed locations.
- E. Fire alarm boxes shall be painted red.

**END OF SECTION**

**SECTION 26 0543****UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. Section Includes:
1. Conduit, ducts, and duct accessories for direct-buried and concrete or slurry-encased duct banks and in single duct runs.
  2. Handholes and pull boxes.

**1.03 DEFINITION**

- A. RNC: Rigid nonmetallic conduit.

**1.04 SUBMITTALS**

- A. Product Data: For the following:
1. Duct-bank materials, including separators and miscellaneous components.
  2. Ducts and conduits and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
  3. Accessories for handholes and pull boxes.
  4. Warning tape.
  5. Warning planks.
- B. Shop Drawings for Factory-Fabricated Handholes and Pull Boxes Other Than Precast Concrete: Include dimensioned plans, sections, and elevations, and fabrication and installation details, including the following:
1. Duct entry provisions, including locations and duct sizes.
  2. Cover design.
  3. Grounding details.
  4. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
- C. Duct-Bank Coordination Drawings: Show duct profiles and coordination with other utilities and underground structures.
1. Include plans and sections, drawn to scale, and show bends and locations of expansion fittings.
  2. Drawings shall be signed and sealed by a qualified professional engineer.
- D. Product Certificates: For concrete and steel used in precast concrete pull boxes and handholes, comply with ASTM C 858.
- E. Qualification Data: For qualified professional engineer and testing agency.
- F. Source quality-control reports.
- G. Field quality-control reports.

**1.05 QUALITY ASSURANCE**

- A. Comply with IEEE C2.
- B. Comply with NFPA 70.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver ducts to Project site with ends capped. Store nonmetallic ducts with supports to prevent bending, warping, and deforming.



- B. Store precast concrete and other factory-fabricated underground utility structures at Project site as recommended by manufacturer to prevent physical damage. Arrange so identification markings are visible.
- C. Lift and support precast concrete units only at designated lifting or supporting points.

#### **1.07 PROJECT CONDITIONS**

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:
  - 1. Notify Construction Manager and owner no fewer than two days in advance of proposed interruption of electrical service.
  - 2. Do not proceed with interruption of electrical service without Construction Manager's and Owner's written permission.

#### **1.08 COORDINATION**

- A. Coordinate layout and installation of ducts, handholes, and pull boxes with final arrangement of other utilities, site grading, and surface features as determined in the field.
- B. Coordinate elevations of ducts and duct-bank entrances into handholes, and pull boxes with final locations and profiles of ducts and duct banks as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations from those indicated as required to suit field conditions and to ensure that duct runs drain to handholes and as approved by Architect.

#### **1.09 EXTRA MATERIALS**

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
- B. Furnish cable-support stanchions, arms, insulators and associated fasteners in quantities equal to 5 percent of quantity of each item installed.

### **PART 2 - PRODUCTS**

#### **2.01 CONDUIT**

- A. Rigid Metal Conduit: Galvanized. Comply with ANSI C80.1 for Risers.
- B. RNC: NEMA TC 2, Type EPC-40-PVC and Type EPC-80-PVC, UL 651, with matching fittings by same manufacturer as the conduit, complying with NEMA TC 3 and UL 514B with markings for "underground" and "sunlight" use.

#### **2.02 NONMETALLIC DUCTS AND DUCT ACCESSORIES**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - 1. AFC Cable Systems.
  - 2. ARNCO Corporation.
  - 3. Beck Manufacturing.
  - 4. Cantex, Inc.
  - 5. CertainTeed Corp.
  - 6. Condux International, Inc.
  - 7. DCX-CHOL Enterprises, Inc.; ELECSYS Division.
  - 8. Electri-Flex Company.
  - 9. IPEX Inc.
  - 10. Lamson & Sessions; Carlon Electrical Products.
  - 11. Manhattan Wire Products; a Belden company.

- C. Underground Plastic Utilities Duct: NEMA TC 6 & 8, Type EB-20-PVC, ASTM F 512, UL 651A, with matching fittings by the same manufacturer as the duct, complying with NEMA TC 9.
- D. Underground Plastic Utilities Duct: NEMA TC 6 & 8, Type DB-60-PVC, ASTM F 512, with matching fittings by the same manufacturer as the duct, complying with NEMA TC 9.
- E. Duct Accessories:
  - 1. Duct Separators: Factory-fabricated rigid PVC interlocking spacers, sized for type and sizes of ducts with which used, and retained to provide minimum duct spacings indicated while supporting ducts during concreting or backfilling.
  - 2. Warning Tape: Underground-line warning tape specified in Section 26 0553, "Electrical Identification."
  - 3. Concrete Warning Planks: Nominal 12 by 24 by 3 inches (300 by 600 by 76 mm) in size, manufactured from 6000-psi (41-MPa) concrete.
    - a. Color: Red dye added to concrete during batching.
    - b. Mark each plank with "ELECTRIC" in 2-inch- (50-mm-) high, 3/8-inch- (10-mm-) deep letters.

### 2.03 PRECAST CONCRETE HANDHOLES AND PULL BOXES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Christy Concrete Products.
  - 2. Cretex Concrete Products West, Inc.; Riverton Division.
  - 3. Elmhurst-Chicago Stone Co.
  - 4. Oldcastle Precast Group.
  - 5. Oldcastle Precast Inc.; Utility Vault Division.
  - 6. Utility Concrete Products, LLC.
  - 7. Wausau Tile Inc.
- B. Comply with ASTM C 858 for design and manufacturing processes.
- C. Ferrous metal hardware shall be hot-dip galvanized in accordance with ASTM A153 (ASTM A153M) and ASTM A123 (ASTM A123M).
- D. Description: Factory-fabricated, reinforced-concrete, monolithically poured walls and bottom unless open-bottom enclosures are indicated. Frame and cover shall form top of enclosure and shall have load rating consistent with that of handhole or pull box.
  - 1. Frame and Cover: Weatherproof cast-iron frame, with cast-iron cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing stainless-steel bolts.
  - 2. Frame and Cover: Weatherproof steel frame, with steel cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing stainless-steel bolts.
  - 3. Frame and Cover: Weatherproof steel frame, with hinged steel access door assembly with tamper-resistant, captive, cover-securing stainless-steel bolts.
    - a. Cover Hinges: Concealed, with hold-open ratchet assembly.
    - b. Cover Handle: Recessed.
  - 4. Frame and Cover: Weatherproof aluminum frame with hinged aluminum access door assembly with tamper-resistant, captive, cover-securing stainless-steel bolts.
    - a. Cover Hinges: Concealed, with hold-open ratchet assembly.
    - b. Cover Handle: Recessed.
  - 5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
  - 6. Cover Legend: Molded lettering, As required for each service.
  - 7. Configuration: Units shall be designed for flush burial and have open bottom unless otherwise indicated.
  - 8. Extensions and Slabs: Designed to mate with bottom of enclosure. Same material as enclosure.
    - a. Extension shall provide increased depth of 12 inches (300 mm).
    - b. Slab: Same dimensions as bottom of enclosure, and arranged to provide closure.

9. Windows: Precast openings in walls, arranged to match dimensions and elevations of approaching ducts and duct banks plus an additional 12 inches (300 mm) vertically and horizontally to accommodate alignment variations.
  - a. Windows shall be located no less than 6 inches (150 mm) from interior surfaces of walls, floors, or frames and covers of handholes, but close enough to corners to facilitate racking of cables on walls.
  - b. Window opening shall have cast-in-place, welded wire fabric reinforcement for field cutting and bending to tie in to concrete envelopes of duct banks.
  - c. Window openings shall be framed with at least two additional No. 4 steel reinforcing bars in concrete around each opening.
10. Duct Entrances in Handhole Walls: Cast end-bell or duct-terminating fitting in wall for each entering duct.
  - a. Type and size shall match fittings to duct or conduit to be terminated.
  - b. Fittings shall align with elevations of approaching ducts and be located near interior corners of handholes to facilitate racking of cable.
11. Handholes 12 inches wide by 24 inches long (300 mm wide by 600 mm long) and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.

#### **2.04 HANDHOLES AND PULL BOXES OTHER THAN PRECAST CONCRETE**

- A. Description: Comply with SCTE 77.
  1. Color: Gray.
  2. Configuration: Units shall be designed for flush burial and have open bottom unless otherwise indicated.
  3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
  4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
  5. Cover Legend: Molded lettering,
    - a. As required for each service.
    - b. Tier level number, indicating that the unit complies with the structural load test for that tier according to SCTE 77.
  6. Direct-Buried Wiring Entrance Provisions: Knockouts equipped with insulated bushings or end-bell fittings, retained to suit box material, sized for wiring indicated, and arranged for secure, fixed installation in enclosure wall.
  7. Duct Entrance Provisions: Duct-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
  8. Handholes 12 inches wide by 24 inches long (300 mm wide by 600 mm long) and larger shall have factory-installed inserts for cable racks and pulling-in irons.
- B. Polymer Concrete Handholes and Pull Boxes with Polymer Concrete Cover: Molded of sand and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or a combination of the two. Handholes and pull boxes shall comply with the requirements of SCTE 7 Tier 5 loading.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
    - a. Armorcast Products Company.
    - b. Carson Industries LLC.
    - c. CDR Systems Corporation.
    - d. Hubbell Power Systems; Lenoir City Division.
    - e. NewBasis.
- C. High-Density Plastic Pull Boxes: Injection molded of high-density polyethylene or copolymer-polypropylene, complying with SCTE 77 Tier 5 loading. Cover shall be polymer concrete.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
  - a. Carson Industries LLC.
  - b. Nordic Fiberglass, Inc.
  - c. Pencil Plastics.

### **PART 3 - EXECUTION**

#### **3.01 CORROSION PROTECTION**

- A. Aluminum shall not be installed in contact with earth or concrete.

#### **3.02 UNDERGROUND DUCT APPLICATION**

- A. Ducts for Electrical Cables over 600 V: RNC, NEMA Type EPC-80-PVC, in concrete-encased duct bank unless otherwise indicated.
- B. Ducts for Electrical Feeders 600 V and Less: RNC, NEMA Type EPC-40-PVC, in concrete-encased duct bank unless otherwise indicated.
- C. Ducts for Electrical Feeders 600 V and Less: RNC, NEMA Type EPC-80-PVC, in direct-buried duct bank unless otherwise indicated.
- D. Ducts for Electrical Branch Circuits: RNC, NEMA Type EPC-40-PVC, in direct-buried duct bank unless otherwise indicated.
- E. Underground Ducts for Telephone, Communications, or Data Utility Service Cables: RNC, NEMA Type EPC-40-PVC, in concrete-encased duct bank unless otherwise indicated.
- F. Underground Ducts for Parking Lot Lighting Branch Circuits: RNC, NEMA Type EPC-80-PVC installed in direct-buried duct bank unless otherwise indicated.
- G. Underground Ducts for Telephone, Communications, or Data Circuits: RNC, NEMA Type EPC-40-PVC, in direct-buried duct bank unless otherwise indicated.
- H. Underground Ducts for Telephone, Communications, or Data Circuits: RNC, NEMA Type EB-20-PVC, in concrete-encased duct bank unless otherwise indicated.
- I. Underground Ducts Crossing Paved Paths, Walkways and Driveways: RNC, NEMA Type EPC-80-PVC, encased in reinforced concrete.

#### **3.03 UNDERGROUND ENCLOSURE APPLICATION**

- A. Handholes and Pull Boxes for 600 V and Less, Including Telephone, Communications, and Data Wiring:
  1. Units in Roadways and Other Deliberate Traffic Paths: Precast concrete. AASHTO HB 17, H-20 structural load rating.
  2. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Precast concrete, AASHTO HB 17, H-20 structural load rating.
  3. Units in Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Precast concrete, AASHTO HB 17, H-10 structural load rating.
  4. Units Subject to Light-Duty Pedestrian Traffic Only: High-density plastic, structurally tested according to SCTE 77 with 3000-lbf (13 345-N) "Light-Duty" vertical loading.

#### **3.04 EARTHWORK**

- A. Excavation and Backfill: Comply with Division 31 Sections 31 2316, "Excavation" and "Fill and Backfill," but do not use heavy-duty, hydraulic-operated, compaction equipment.
- B. Restore surface features at areas disturbed by excavation and reestablish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.

- C. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching.

### 3.05 DUCT INSTALLATION

- A. Slope: Pitch ducts a minimum slope of 1:300 down toward pull boxes and handholes and away from buildings and equipment. Slope ducts from a high point in runs between two handholes to drain in both directions.
- B. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches (1220 mm), both horizontally and vertically, at other locations unless otherwise indicated.
- C. Joints: Use approved cleaner and solvent-cemented joints in ducts and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent ducts do not lie in same plane.
- D. Duct Entrances to Concrete and Polymer Concrete Handholes: Use end bells, spaced approximately 10 inches (250 mm) o.c. for 5-inch (125-mm) ducts, and vary proportionately for other duct sizes.
  - 1. Begin change from regular spacing to end-bell spacing 10 ft. (3 m) from the end bell without reducing duct line slope and without forming a trap in the line.
  - 2. Direct-Buried Duct Banks: Install an expansion and deflection fitting in each conduit in the area of disturbed earth adjacent to handhole.
  - 3. Grout end bells into structure walls from both sides to provide watertight entrances.
- E. Building Wall Penetrations: Make a transition from underground duct to rigid steel conduit at least 10 ft. (3 m) outside the building wall without reducing duct line slope away from the building and without forming a trap in the line. Use fittings manufactured for duct-to-conduit transition. Install conduit penetrations of building walls as specified in Division 26 Section 26 0533, "Raceways and Boxes for Electrical Systems."
- F. Sealing: Provide temporary closure at terminations of ducts that have cables pulled. Seal spare ducts at terminations. Use sealing compound and plugs to withstand at least 15-psi (1.03-MPa) hydrostatic pressure.
- G. Pulling Cord: Install 100-lbf- (445-N-) test nylon cord in ducts, including spares.
- H. Concrete or Slurry-Encased Ducts: Support ducts on duct separators.
  - 1. Separator Installation: Space separators close enough to prevent sagging and deforming of ducts, with not less than 4 spacers per 20 ft. (6 m) of duct. Secure separators to earth and to ducts to prevent floating during concreting. Stagger separators approximately 6 inches (150 mm) between tiers. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
  - 2. Minimum slurry psi shall be determined by the engineer of record with a minimum of 2000 psi.
  - 3. Red dye shall be used for all duct bank concrete or slurry.
  - 4. Concreting Sequence: Pour each run of envelope between handholes or other terminations in one continuous operation.
    - a. Start at one end and finish at the other, allowing for expansion and contraction of ducts as their temperature changes during and after the pour. Use expansion fittings installed according to manufacturer's written recommendations, or use other specific measures to prevent expansion-contraction damage.
    - b. If more than one pour is necessary, terminate each pour in a vertical plane and install 3/4-inch (19-mm) reinforcing rod dowels extending 18 inches (450 mm) into concrete on both sides of joint near corners of envelope.
  - 5. Pouring Concrete: Spade concrete carefully during pours to prevent voids under and between conduits and at exterior surface of envelope. Do not allow a heavy mass of

- concrete to fall directly onto ducts. Use a plank to direct concrete down sides of bank assembly to trench bottom. Allow concrete to flow to center of bank and rise up in middle, uniformly filling all open spaces. Do not use power-driven agitating equipment unless specifically designed for duct-bank application.
6. Reinforcement: Reinforce concrete-encased duct banks where they cross disturbed earth and where indicated. Arrange reinforcing rods and ties without forming conductive or magnetic loops around ducts or duct groups.
  7. Forms: Use walls of trench to form side walls of duct bank where soil is self-supporting and concrete envelope can be poured without soil inclusions; otherwise, use forms.
  8. Minimum Space between Ducts: 4 inches (100 mm) between ducts and exterior envelope wall, 3 inches (75 mm) between ducts and exterior envelope bottom, 3 inches (75 mm) between ducts for like services, and 4 inches (100 mm) between power and signal ducts.
  9. Depth: Install top of duct bank at least 24 inches (600 mm) below finished grade in areas not subject to deliberate traffic, and at least 30 inches (750 mm) below finished grade in deliberate traffic paths for vehicles unless otherwise indicated.
  10. Stub-Ups: Use manufactured galvanized rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor with 20 mil PVC tape wrap the entire length.
    - a. Couple steel conduits to ducts with adapters designed for this purpose, when coupling is connected to different materials, the coupling shall be of greater strength.
    - b. Stub-Ups to Equipment: For equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of base. Install insulated grounding bushings on terminations at equipment.
    - c. Minimum conduit bend radius shall be 12 X the conduit diameter.
  11. Warning Tape: Bury warning tape approximately 12 inches (300 mm) above all concrete-encased ducts and duct banks. Align tape parallel to and within 3 inches (75 mm) of the centerline of duct bank. Provide an additional warning tape for each 12-inch (300-mm) increment of duct-bank width over a nominal 18 inches (450 mm). Space additional tapes 12 inches (300 mm) apart, horizontally.
- I. Direct-Buried Duct Banks:
1. Support ducts on duct separators coordinated with duct size, duct spacing, and outdoor temperature.
  2. Space separators close enough to prevent sagging and deforming of ducts, with not less than 4 spacers per 20 ft. (6 m) of duct. Secure separators to earth and to ducts to prevent displacement during backfill and yet permit linear duct movement due to expansion and contraction as temperature changes. Stagger spacers approximately 6 inches (150 mm) between tiers.
  3. Excavate trench bottom to provide firm and uniform support for duct bank. Prepare trench bottoms as specified in Division 31 Section 31 2316, "Excavation" for pipes less than 6 inches (150 mm) in nominal diameter. Bedding material shall be granular with a sand equivalent (SE) > 30.psi
  4. Install backfill as specified in Division 31 Section 31 2323, "Fill and Backfill."
  5. After installing first tier of ducts, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand-place backfill to 4 inches (100 mm) over ducts and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction as specified in Division 31 Section 31 2323, "Fill and Backfill."
  6. Minimum Space between Ducts: 4 inches (100 mm) between ducts and exterior envelope wall, 3 inches (75 mm) between ducts and exterior envelope bottom, 3 inches (75 mm) between ducts for like services, and 4 inches (100 mm) between power and signal ducts.

7. Depth: Install top of duct bank at least 36 inches (900 mm) below finished grade unless otherwise indicated.
8. Set elevation of bottom of duct bank below the frost line.
9. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
10. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.
  - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete.
  - b. For equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.
11. Warning Planks: Bury warning planks approximately 12 inches (300 mm) above direct-buried ducts and duct banks, placing them 24 inches (600 mm) o.c. Align planks along the width and along the centerline of duct bank. Provide an additional plank for each 12-inch (300-mm) increment of duct-bank width over a nominal 18 inches (450 mm). Space additional planks 12 inches (300 mm) apart, horizontally.

### 3.06 INSTALLATION OF CONCRETE HANDHOLES AND PULL BOXES

- A. Precast Concrete Handhole Installation:
  1. Comply with ASTM C 891 unless otherwise indicated.
  2. Install units level and plumb and with orientation and depth coordinated with connecting ducts to minimize bends and deflections required for proper entrances.
  3. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1-inch (25-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.
- B. Elevations:
  1. Install handholes with bottom below the frost line.
  2. Handhole Covers: In paved areas and trafficways, set surface flush with finished grade. Set covers of other handholes 1 inch (25 mm) above finished grade.
  3. Where indicated, cast handhole cover frame integrally with handhole structure.
- C. Waterproofing: Apply waterproofing to exterior surfaces of handholes after concrete has cured at least three days. After ducts have been connected and grouted, and before backfilling, waterproof joints and connections and touch up abrasions and scars

### 3.07 INSTALLATION OF HANDHOLES AND PULL BOXES OTHER THAN PRECAST CONCRETE

- A. Install handholes and pull boxes level and plumb and with orientation and depth coordinated with connecting ducts to minimize bends and deflections required for proper entrances. Use pull box extension if required to match depths of ducts, and seal joint between box and extension as recommended by the manufacturer.
- B. Unless otherwise indicated, support units on a level 6-inch- (15-cm-) thick bed of crushed stone or gravel, graded from 1/2-inch (12.7-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: Set so cover surface will be flush with finished grade.
- D. Install handholes and pull boxes with bottom below the frost line.
- E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Retain arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.

- F. Field-cut openings for ducts and conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.
- G. For enclosures installed in asphalt paving and subject to occasional, nondeliberate, heavy-vehicle loading, form and pour a concrete ring encircling, and in contact with, enclosure and with top surface screeded to top of box cover frame. Bottom of ring shall rest on compacted earth.
  - 1. Concrete: 3000 psi (20 kPa), 28-day strength, complying with Division 03 Section "Cast-in-Place Concrete," with a troweled finish.
  - 2. Dimensions: 10 inches wide by 12 inches deep (250 mm wide by 300 mm deep).

### **3.08 GROUNDING**

- A. Ground underground ducts and utility structures according to Division 26 Section "Grounding and Bonding."

### **3.09 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections:
  - 1. Demonstrate capability and compliance with requirements on completion of installation of underground ducts and utility structures.
  - 2. Pull aluminum or wood test mandrel through duct to prove joint integrity and test for out-of-round duct. Provide mandrel equal to 80 percent fill of duct. If obstructions are indicated, remove obstructions and retest.
  - 3. Test handhole grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Division 26 Section "Grounding and Bonding."
- B. Correct deficiencies and retest as specified above to demonstrate compliance.
- C. Prepare test and inspection reports.

### **3.10 CLEANING**

- A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of ducts. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

**END OF SECTION 260543**



**SECTION 26 0553**  
**ELECTRICAL IDENTIFICATION**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Nameplates and labels.
- B. Wire and cable markers.
- C. Conduit markers.
- D. Field-painted identification of conduit.

**1.02 RELATED SECTIONS**

- A. Section 09 9000 - Painting and Coating.

**1.03 REFERENCES**

- A. NFPA 70 - National Electrical Code; National Fire Protection Association; 2014.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Submittals for submittals procedures.
- B. Product Data: Provide catalog data for nameplates, labels, and markers.
- C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Quality Assurance. Include instructions for storage, handling, protection, examination, preparation and installation of product.

**1.05 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by testing firm acceptable to authority having jurisdiction as suitable for purpose specified and shown.

**1.06 EXTRA MATERIALS**

- A. See Section 01 6000 - Product Requirements for additional requirements.

**PART 2 PRODUCTS****2.01 NAMEPLATES AND LABELS**

- A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.
- B. Locations:
  - 1. Each electrical distribution and control equipment enclosure.
  - 2. Communication cabinets.
- C. Letter Size:
  - 1. Use 1/8 inch (3 mm) letters for identifying individual equipment and loads.
  - 2. Use 1/4 inch (6 mm) letters for identifying grouped equipment and loads.
- D. Labels: Embossed adhesive tape, with 3/16 inch (5 mm) white letters on black background. Use only for identification of individual wall switches and receptacles, and control device stations.

**2.02 WIRE MARKERS**

- A. Description: Cloth, tape, split sleeve, or tubing type wire markers.
- B. Locations: Each conductor at panelboard gutters, pull boxes, outlet boxes, junction boxes, and at each load connection.
- C. Legend:
  - 1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
  - 2. Control Circuits: Control wire number indicated on schematic and interconnection diagrams on drawings.

**2.03 CONDUIT MARKERS**

- A. Location: Furnish markers for each conduit longer than 6 feet (2 m).
- B. Spacing: 20 feet (6 m) on center.
- C. Color:
  - 1. 480 Volt System: Orange.
  - 2. 208 Volt System: Black.
  - 3. Fire Alarm System: Red.
  - 4. Telephone System: Blue.
- D. Legend:
  - 1. 480 Volt System: Orange.
  - 2. 208 Volt System: Black.
  - 3. Fire Alarm System: Red.
  - 4. Telephone System: Blue.

**2.04 UNDERGROUND WARNING TAPE**

- A. Description: 4 inch (100 mm) wide plastic tape, detectable type colored yellow with suitable warning legend describing buried electrical lines.

**PART 3 EXECUTION****3.01 PREPARATION**

- A. Degrease and clean surfaces to receive nameplates and labels.

**3.02 INSTALLATION**

- A. Install nameplates and labels parallel to equipment lines.
- B. Secure nameplates to equipment front using adhesive.
- C. Secure nameplates to inside surface of door on panelboard that is recessed in finished locations.
- D. Identify conduit using field painting under provisions of Division 1.
  - 1. Paint colored band on each conduit longer than 6 feet (2 m).
  - 2. Paint bands 20 feet (6 m) on center.
  - 3. Colors:
    - a. 480 Volt System: Orange.
    - b. 208 Volt System: Black.
    - c. Fire Alarm System: Red.
    - d. Telephone System: Blue.
- E. Identify underground conduits using underground warning tape. Install one tape per trench at 3 inches (75 mm) below finished grade.

**END OF SECTION**

**SECTION 26 0573**  
**OVERCURRENT PROTECTIVE DEVICES**

**PART 1 GENERAL****1.01 RELATED DOCUMENTS**

- A. The provisions of Section 26 0510, "General Electrical Requirements" and Section 26 2726, "Wiring Devices".

**1.02 REFERENCES**

- A. National Electrical Manufacturer Association FU 1.
- B. National Electrical Code.

**1.03 SUMMARY**

- A. Circuit breakers (each type and style).
- B. Circuit breaker handle padlock assembly.
- C. Fuses (each type and style).
- D. Disconnect switches (each type and size).
- E. Enclosures (each type and style).

**1.04 WARRANTY**

- A. Warranty shall comply with the provisions of Section 26 0510, "General Electrical Requirements".

**PART 2 PRODUCTS****2.01 CIRCUIT BREAKERS**

- A. Circuit breakers for panelboards, distribution panelboards, distribution switchboards, and main service equipment shall be the manufactured product of the same manufacturer as the equipment in which the circuit breaker is installed.
- B. Circuit breakers for panelboards and distribution panelboards shall be bolt-on type. Handle ties and dual, quad or tandem breakers are not acceptable. Mounting hardware, accessories, faceplates, enclosures, etc., shall be provided as required. Each and every circuit breaker shall be provided with a handle padlock attachment. This attachment shall allow the circuit breaker to be padlocked in either the "ON" or "OFF" position. Circuit breakers for distribution switchboards and main service equipment shall be as specified in Section 26 24 16, "Panelboards".
- C. Circuit breakers shall be quick-break on manual and automatic operation, and the handle mechanism shall be trip-free to prevent holding contact closed against a short circuit or sustained overload. Contacts shall be of high pressure butt-type and shall be made of a silver alloy material. Arc chutes shall be provided. Automatic thermal and magnetic tripping devices shall be located in each pole for the breaker. The thermal device shall provide time delay tripping on overloads and the magnetic device shall provide instantaneous tripping on short circuits. Circuit breakers with frame sizes above 100 amperes shall have an instantaneous-magnetic trip adjustment of ten times the circuit breaker's continuous amp rating (unless otherwise indicated). These adjustments shall be accessible from the front of the breaker.
- D. Circuit breakers used for switching lighting loads directly shall be approved Type "SW".
- E. Circuit breakers used to control motor loads directly shall be approved Type "HACR".
- F. Short circuit interrupting capacity shall be as indicated on the plans and shall in no case be less than 10,000 amps symmetrical at 208/120 volt.
- G. Circuit breakers provided for installation in existing switchboards or panelboards shall be of the same manufacturer as the existing switchboards or panelboards. The minimum A.I.C. shall not be less than that of the lowest rated device in the existing switchboard or panelboard.

**2.02 FUSES:**

- A. Fuse identification labels, showing size and type installed, shall be placed inside the cover of each switch or fused circuit breaker.
- B. All fuses shall be of one (1) manufacturer unless otherwise noted to ensure selective operation of protective devices.
- C. Fuses shall be as manufactured by Bussman n, Gould-Shawmut, or Brush u nless otherwise indicated.
- D. Fuses shall be of the following type:
  - 1. Fuses 601 A through 6000 A serving all type of loads shall be U.L. Class L, type KRP-C.
  - 2. Fuses installed in safety switches at motor locations shall be 600 V, FRS or 250V, FRN.
  - 3. Fuses 1/10 A through 60 0 A shall be U.L. Class RK1; 600V, LPS-RK; 250V, LPN-RK, unless otherwise noted.
- E. Spare fuses shall be provided in the amount of 20 percent of each size and type installed, but in no case shall be less than three (3) of each specified size and type supplied. These spare s shall be neatly enclosed in a suitable cabinet or cabinets.

**2.03 DISCONNECT SWITCHES:**

- A. The disconnect switches shall be heavy duty 600 volt type, externally operated, quick-made, quick-break knife switches, fused or non-fused as required. The number of poles and ampere rating shall be as shown on plans. Fused switches shall have Class "R" rejection features. All switches shall have a U.L. listed short circuit withstand rating. Switches in interior dry location shall be NEMA 1 enclosure s. Switches in damp or exterior lo cations shall have NEMA 3R raintight enclosures. Switches shall be horsepower rated, unless otherwise specified.
- B. If double lugging or oversized wires are required, provide a wireway or splice box.
- C. Provide fuses as specified in this section. Fuses shall be installed so that the rating is clearly visible without removing fuse.
- D. Provide a nameplate on each switch as specified in Section 26 0553, "Identification For Electrical Systems". Nameplate shall indicate load served, source and circuit number.
- E. Submit data on switch es with drawings of the mai n switchboard, distribution switchboards or distribution panelboards, where switches are an assembled part.

**PART 3 EXECUTION****3.01 INSTALLATION**

- A. Bolted connections shall be torque-tightened to manufacturer's specifications.
- B. Clipping of wire s from standard cable to fit connector shall not be permitted. Appropriate connecting device shall be provided for multiple cable connections.
- C. Install disconnect switches in locations shown on plans. Test switches a minimum of three (3) times to ensure correct operation.

**3.02 TESTS:**

- A. Each and every circuit breaker shall be tested under load a minimum of three (3) times.

**END OF SECTION**

**SECTION 26 0923**  
**LIGHTING CONTROL DEVICES**

**PART 1 GENERAL****1.01 RELATED DOCUMENTS**

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

**1.02 SUMMARY**

- A. This Section includes photoelectric relays, occupancy sensors, and multiple lighting relays and contactors.
- B. Related Sections include the following:
  - 1. Division 26 Section 26 27 26 – "Wiring Devices" for wall-box dimmers and manual light switches.

**1.03 SUBMITTALS**

- A. Product Data: Include dimensions and data on features, components, and ratings for lighting control devices.
- B. Samples: Occupancy sensors, one of each type.
- C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
- D. Maintenance Data: For lighting control devices to include in maintenance manuals specified in Division 1– Operation and Maintenance Data.

**1.04 QUALITY ASSURANCE**

- A. Source Limitations: Obtain lighting control devices from a single source with total responsibility for compatibility of lighting control system components specified in this Section.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, for their indicated use and installation conditions by a testing agency acceptable to authorities having jurisdiction.
- C. Comply with 47 CFR 15, Subparts A and B, for Class A digital devices.
- D. Comply with NFPA 70.

**1.05 COORDINATION**

- A. Coordinate features of devices specified in this Section with systems and components specified in other Sections to form an integrated system of compatible components. Match components and interconnections for optimum performance of specified functions.

**PART 2 PRODUCTS****2.01 PRODUCTS**

- A. Contactors and Relays:
- B. Photoelectric Relays:
- C. Occupancy Sensors:

**2.02 GENERAL LIGHTING CONTROL DEVICE REQUIREMENTS**

- A. Line-Voltage Surge Protection: Include in all 120 - and 277-V solid-state equipment. Comply with UL 1449 and with ANSI C62.41 for Category A locations.

**2.03 PHOTOELECTRIC RELAYS**

- A. Description: Solid state, with single-pole, double-throw dry contacts rated to operate connected relay or contactor coils or microprocessor input, and complying with UL 773A.
- B. Light-Level Monitoring Range: 0 to 3500 fc, with an adjustment for turn-on/turn-off levels.
- C. Time Delay: Prevents false operation.

- D. Outdoor Sealed Units: Weathertight housing, resistant to high temperatures and equipped with sun-glare shield.

#### 2.04 OCCUPANCY SENSORS

- A. Ceiling-Mounting or Wall Mounted Units: Unit receives control power from a separately mounted auxiliary power and control unit, and operates power switching contacts in that unit.
- B. Ceiling-Mounting Units for use with programmable, microprocessor-based systems: Unit receives 24-V dc power from a remote source and, on sensing occupancy, closes contacts that provide signal input the lighting control system.
- C. Switch-Box-Mounting Units: Unit receives power directly from switch leg of the 120- or 277-V ac circuit it controls and operates integral power switching contacts rated 800 W at 120-V ac, and 1000 W at 277-V ac, minimum.
- D. Operation: Turns lights on when room or covered area is occupied and off when unoccupied, unless otherwise indicated.
  - 1. Time Delay for Turning Lights Off: Adjustable over a range from 1 to 15 minutes, minimum.
  - 2. Manual Override Switch for switch-box mounted units: Turns lights off manually regardless of elapsed time delay.
  - 3. Isolated Relay Contact: Operates on detection of occupancy or vacancy, as indicated, to activate an independent function (refer to Section 15940 – Sequences of Operation).
- E. Auxiliary Power and Control Units: As follows:
  - 1. Relays rated for a minimum of 20-A normal ballast load or 13-A tungsten filament or high-inrush ballast load.
  - 2. Sensor Power Supply: Rated to supply the number of connected sensors.
- F. Dual-Technology Type: Uses a combination of passive-infrared and ultrasonic detection methods to distinguish between occupied and unoccupied conditions for area covered. Particular technology or combination of technologies that controls each function (on or off) is selectable in the field by selection of jumpers or dip-switches on unit.

#### 2.05 MULTIPOLE CONTACTORS AND RELAYS

- A. Description: Electrically operated and mechanically held, and complying with UL 508 and NEMA ICS 2.
  - 1. Current Rating for Switching: UL listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast (ballasts with 15 percent or less total harmonic distortion of normal load current).
  - 2. Control Coil Voltage: Match control power source.

### PART 3 EXECUTION

#### 3.01 INSTALLATION

- A. Install equipment level and plumb and according to manufacturer's written instructions.
- B. Mount lighting control devices according to manufacturer's written instructions.
- C. Mounting heights indicated are to bottom of unit for suspended devices and to center of unit for wall-mounting devices.

#### 3.02 CONTROL WIRING INSTALLATION

- A. Install wiring between sensing and control devices according to manufacturer's written instructions and as specified in Section 26 0519 – "Building Wires and Cable" for low-voltage connections.
- B. Wiring Method: Install all wiring as specified in Division 26 Section 26 0533 – "Raceways, Fittings and Boxes."
- C. Bundle, train, and support wiring in enclosures.
- D. Ground equipment.

- E. Connections: Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.

### 3.03 IDENTIFICATION

- A. Identify components and power and control wiring according to Section 26 0553 – "Electrical Identification."

### 3.04 FIELD QUALITY CONTROL

- A. Schedule visual and mechanical inspections and electrical tests with at least seven days advance notice.
- B. Inspect control components for defects and physical damage, testing laboratory labeling, and nameplate compliance with the Contract Documents.
- C. Check tightness of electrical connections with torque wrench calibrated within previous six months. Use manufacturer's recommended torque values.
- D. Verify settings of photoelectric devices with photometer calibrated within previous six months.
- E. Electrical Tests: Use particular caution when testing devices containing solid-state components. Perform the following according to manufacturer's written instructions:
  - 1. Continuity tests of circuits.
  - 2. Operational Tests: Set and operate devices to demonstrate their functions and capabilities in a methodical sequence that cues and reproduces actual operating functions.
    - a. Include testing of devices under conditions that simulate actual operational conditions. Record control settings, operations, cues, and functional observations.
- F. Correct deficiencies, make necessary adjustments, and retest. Verify that specified requirements are met.
- G. Test Labeling: After satisfactory completion of tests and inspections, apply a label to tested components indicating test results, date, and responsible agency and representative.
- H. Reports: Written reports of tests and observations. Record defective materials and workmanship and unsatisfactory test results. Record repairs and adjustments.

### 3.05 CLEANING

- A. Cleaning: Clean equipment and devices internally and externally using methods and materials recommended by manufacturers, and repair damaged finishes.

### 3.06 DEMONSTRATION

- A. Engage a factory-authorized service representative to train owner's maintenance personnel as specified below:
  - 1. Train owner maintenance personnel on troubleshooting, servicing, adjusting, and preventive maintenance. Provide a minimum of three hours training.
  - 2. Training Aid: Use the approved final version of maintenance manuals as a training aid.
  - 3. Schedule training with owner, through Architect, with at least seven days advance notice.

### 3.07 ON-SITE ASSISTANCE

- A. Occupancy Adjustments: Within one year of date of Substantial Completion, provide up to three Project site visits, when requested, to adjust light levels, make program changes, and adjust sensors and controls to suit actual conditions.

**END OF SECTION**

**SECTION 26 2413  
SWITCHBOARDS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Switchboards.
- B. Switchboard accessories.

**1.02 RELATED SECTIONS**

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete for supporting foundations and pads.
- B. Section 26 0526 - Grounding and Bonding.

**1.03 REFERENCES**

- A. ANSI C12.1 - American National Standard Code for Electricity Metering; 2008.
- B. ANSI C39.1 - American National Standard Requirements for Electrical Analog Indicating Instruments; 1981 (R1992).
- C. IEC 60051-1 - Direct Acting Indicating Analogue Electrical Measuring Instruments and Their Accessories - Part 1: Definitions and General Requirements Common To All Parts; International Electrotechnical Commission; 1997.
- D. IEC 60051-2 - Direct Acting Indicating Analogue Electrical Measuring Instruments and Their Accessories - Part 2: Special Requirements for Ammeters and Voltmeters International Electrotechnical Commission; 1984.
- E. IEEE C12.1 - American National Standard Code for Electricity Metering; Institute of Electrical and Electronic Engineers; 1988.
- F. IEEE C57.13 - IEEE Standard Requirements for Instrument Transformers; Institute of Electrical and Electronic Engineers; 1993 (R 2003).
- G. NECA 400 - Recommended Practice for Installing and Maintaining Switchboards; National Electrical Contractors Association; 2007.
- H. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum); National Electrical Manufacturers Association; 2013.
- I. NEMA PB 2 - Deadfront Distribution Switchboards; National Electrical Manufacturers Association; 2012.
- J. NEMA PB 2.1 - General Instructions for Proper Handling, Installation, Operation, and Maintenance of Deadfront Distribution Switchboards Rated 600 Volts or Less; National Electrical Manufacturers Association; 2007.
- K. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; 2003.
- L. NFPA 70 - National Electrical Code; National Fire Protection Association; 2014.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Submittals, for submittal procedures.
- B. Product Data: Provide electrical characteristics including voltage, frame size and trip ratings, fault current withstand ratings, and time-current curves of all equipment and components.
- C. Shop Drawings: Indicate front and side views of enclosures with overall dimensions shown; conduit entrance locations and requirements; nameplate legends; size and number of bus bars per phase, neutral, and ground; and switchboard instrument details.
- D. Test Reports: Indicate results of factory production tests.
- E. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.



- F. Project Record Documents: Record actual locations of switchboards.
- G. Maintenance Data: Include spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

#### **1.05 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Products: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver in 48 inch (219 mm) maximum width shipping splits, individually wrapped for protection and mounted on shipping skids.
- B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- C. Handle in accordance with NEMA PB 2.1 and manufacturer's written instructions. Lift only with lugs provided for the purpose. Handle carefully to avoid damage to switchboard internal components, enclosure, and finish.

#### **1.07 MAINTENANCE MATERIALS**

- A. See Section 01 6000 - Product Requirements, for additional provisions.
- B. Furnish two of each key.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Eaton Electrical/Cutler-Hammer: [www.eatonelectrical.com](http://www.eatonelectrical.com).
- B. GE Industrial: [www.geindustrial.com](http://www.geindustrial.com).
- C. Square D: [www.squared.com](http://www.squared.com).
- D. Siemens: [www.sea-siemens.com](http://www.sea-siemens.com)

#### **2.02 SWITCHBOARDS**

- A. Description: NEMA PB 2 switchboard with electrical ratings and configurations as indicated and specified.
- B. Ratings:
  - 1. Voltage: 120/240 volts.
  - 2. Configuration: Single phase, three wire, grounded.
  - 3. Main Bus: As indicated on the single line diagram.
  - 4. Integrated Equipment Rating: As indicated in the single line diagram (rms amperes symmetrical).
- C. Main Section Devices: Panel mounted.
- D. Distribution Section Devices: Panel mounted.
- E. Auxiliary Section Devices: Individually mounted.
- F. Bus Material: hard drawn Copper, 98% conductivity, standard size.
- G. Bus Connections: Bolted, accessible from front for maintenance.
- H. Fully insulate load side bus bars. Do not reduce spacing of insulated bus.
- I. Ground Bus: Extend length of switchboard.
- J. Insulated Ground Bus: Extend length of switchboard.
- K. Molded Case Circuit Breakers: Integral thermal and instantaneous magnetic trip in each pole.
  - 1. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch

- circuits.
2. Include shunt trip and undervoltage release where indicated.
- L. Line and Load Terminations: Accessible from the front only of the switchboard, suitable for the conductor materials and sizes indicated.
  - M. Metering Transformer Compartment: For utility company's use; compartment size, bus spacing and drilling, door, and locking and sealing requirements in accordance with utility company's requirements.
  - N. Pull Section:
    1. In accordance with utility company's requirements.
  - O. Future Provisions: Fully equip spaces for future devices with bussing and bus connections, suitably insulated and braced for short circuit currents. Provide continuous current rating as indicated.
  - P. Enclosure: Type 1 - General Purpose; Type 3R - Raintight.
    1. Align sections at rear only.
    2. Switchboard Height: 90 inches (2250 mm), excluding floor sills, lifting members and pull boxes.
    3. Finish: Manufacturer's standard light gray enamel over external surfaces. Coat internal surfaces with minimum one coat corrosion-resisting paint, or plate with cadmium or zinc.

### **2.03 SOURCE QUALITY CONTROL**

- A. Shop inspect and test switchboard according to NEMA PB 2.
- B. Make completed switchboard available for inspection at manufacturer's factory prior to packaging for shipment. Notify engineer at least 7 days before inspection is allowed.
- C. Allow witnessing of factory inspections and tests at manufacturer's test facility. Notify engineer at least 7 days before inspections and tests are scheduled.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Provide concrete housekeeping pad under the provisions of Section 03 3000.
- B. Verify that field measurements are as indicated on shop drawings.

### **3.02 INSTALLATION**

- A. Install switchboard in locations shown on drawings, according to NEMA PB 2.1.
- B. Install in a neat and workmanlike manner, as specified in NECA 400.
- C. Tighten accessible bus connections and mechanical fasteners after placing switchboard.
- D. Install fuses in each switch.

### **3.03 FIELD QUALITY CONTROL**

- A. Perform field inspection and testing in accordance with Section 01400.
- B. Inspect and test in accordance with NETA STD ATS, except Section 4.
- C. Perform inspections and tests listed in NETA STD ATS, Section 7.1.

### **3.04 ADJUSTING**

- A. Adjust all operating mechanisms for free mechanical movement.
- B. Tighten bolted bus connections in accordance with manufacturer's instructions.
- C. Adjust circuit breaker trip and time delay settings to values indicated.
- D. Adjust circuit breaker trip and time delay settings to values as instructed by engineer.

### **3.05 CLEANING**

- A. Touch up scratched or marred surfaces to match original finish.

**END OF SECTION**

**SECTION 26 2416  
PANELBOARDS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Power distribution panelboards.
- B. Lighting and appliance panelboards.

**1.02 RELATED SECTIONS**

- A. Section 26 0526 - Grounding and Bonding.
- B. Section 26 0553 - Electrical Identification.
- C. Section 26 2813 - Fuses.

**1.03 REFERENCES**

- A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2010.
- B. NEMA ICS 2 - Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More than 2000 Volts AC or 750 Volts DC; National Electrical Manufacturers Association; 2000 (R2005).
- C. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum); National Electrical Manufacturers Association; 2013.
- D. NEMA PB 1 - Panelboards; National Electrical Manufacturers Association; 2011.
- E. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; National Electrical Manufacturers Association; 2007.
- F. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; 2003.
- G. NFPA 70 - National Electrical Code; National Fire Protection Association; 2014.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Submittals, for submittal procedures.
- B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.
- C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- D. Project Record Documents: Record actual locations of panelboards and record actual circuiting arrangements.
- E. Maintenance Data: Include spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

**1.05 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Products: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

**1.06 MAINTENANCE MATERIALS**

- A. Furnish two of each panelboard key.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Eaton Electrical/Cutler-Hammer: [www.eatonelectrical.com](http://www.eatonelectrical.com).
- B. GE Industrial: [www.geindustrial.com](http://www.geindustrial.com).
- C. Square D: [www.squared.com](http://www.squared.com).
- D. Siemens: [www.sea-siemens.com](http://www.sea-siemens.com)

## 2.02 POWER DISTRIBUTION PANELBOARDS

- A. Description: NEMA PB 1, circuit breaker type.
- B. Panelboard Bus: Copper, ratings as indicated. Provide copper ground bus in each panelboard.
- C. Minimum integrated short circuit rating: As indicated.
  - 1. 240 Volt Panelboards: 10,000 amperes rms symmetrical.
- D. Molded Case Circuit Breakers: With integral thermal and instantaneous magnetic trip in each pole; UL listed. For air conditioning equipment branch circuits provide circuit breakers UL listed as Type HACR.
- E. Circuit Breaker Accessories: Trip units and auxiliary switches as indicated.
- F. Enclosure: NEMA PB 1, Type 1 or 3R, 6 inches (153 mm) deep, 20 inches (508 mm) wide, cabinet box.
- G. Cabinet Front: Surface type, fastened with concealed trim clamps, hinged door with flush lock, metal directory frame, finished in manufacturer's standard gray enamel.

## 2.03 LIGHTING AND APPLIANCE PANELBOARDS

- A. Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard.
- B. Panelboard Bus: Copper, ratings as indicated. Provide copper ground bus in each panelboard; provide insulated ground bus where scheduled.
- C. Minimum Integrated Short Circuit Rating: As indicated.
  - 1. 240 Volt Panelboards: 10,000 amperes rms symmetrical.
- D. Molded Case Circuit Breakers: Thermal magnetic trip circuit breakers, bolt-on type, with common trip handle for all poles; UL listed.
  - 1. Type SWD for lighting circuits.
  - 2. Type HACR for air conditioning equipment circuits.
  - 3. Class A ground fault interrupter circuit breakers where scheduled.
  - 4. Do not use tandem circuit breakers.
- E. Enclosure: NEMA PB 1, Type 1 or 3R.
- F. Cabinet Box: 6 inches (153 mm) deep, 20 inches (508 mm) wide for 240 volt and less panelboards, 20 inches (508 mm) wide for 480 volt panelboards.
- G. Cabinet Front: Flush or surface cabinet front with concealed trim clamps, concealed hinge, metal directory frame, and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install panelboards in accordance with NEMA PB 1.1 and NECA 1.
- B. Install panelboards plumb. Install recessed panelboards flush with wall finishes.
- C. Height: 6 feet (1800 mm) to top of panelboard; install panelboards taller than 6 feet (1800 mm) with bottom no more than 4 inches (100 mm) above floor.
- D. Provide filler plates for unused spaces in panelboards.
- E. Provide typed or neatly handwritten circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.
- F. Provide engraved plastic nameplates under the provisions of Section 26 0553.

- G. Provide spare conduits out of each recessed panelboard to an accessible location above ceiling or below floor. Identify each as SPARE.
  - 1. Minimum spare conduits: 5 empty 1 inch (DN27).
- H. Ground and bond panelboard enclosure according to Section 26 0526.

**3.02 FIELD QUALITY CONTROL**

- A. Perform field inspection and testing in accordance with Section 01400.
- B. Inspect and test in accordance with NETA STD ATS, except Section 4.
- C. Perform inspections and tests listed in NETA STD ATS, Section 7.5 for switches, Section 7.6 for circuit breakers.

**3.03 ADJUSTING**

- A. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

**END OF SECTION**

**SECTION 26 2701  
ELECTRICAL UTILITY SERVICES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Service racks.
- B. Metering transformer cabinets.
- C. Meter bases.

**1.02 RELATED SECTIONS**

- A. Section 26 2413 - Switchboards: Metering transformer compartment.

**1.03 REFERENCES**

- A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2010.
- B. NFPA 70 - National Electrical Code; National Fire Protection Association; 2014.

**1.04 SYSTEM DESCRIPTION**

- A. System Characteristics: 120/240 volts, single phase, three-wire, 60 Hertz.
- B. Service Entrance:

**1.05 SUBMITTALS**

- A. See Section 01 3000 - Submittals, for submittal procedures.
- B. Product Data: Provide ratings and dimensions of transformer cabinets and meter bases.
- C. Submit utility company-prepared drawings.

**1.06 QUALITY ASSURANCE**

- A. Utility Company:
- B. Perform work in accordance with utility company written requirements and NFPA 70.
  - 1. Maintain one copy of each document on site.
- C. Products: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

**1.07 PRE-INSTALLATION MEETING**

- A. Convene one week prior to commencing work of this section. Review service entrance requirements and details with Utility Company representative.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. GE Industrial: [www.geindustrial.com](http://www.geindustrial.com).
- B. Milbank Manufacturing: [www.milbankmfg.com](http://www.milbankmfg.com).
- C. Square D: [www.squared.com](http://www.squared.com).
- D. Siemens
- E. Cutler Hammer.

**2.02 COMPONENTS**

- A. Metering Transformer Cabinets: Sheet metal cabinet with hinged door, conforming to utility company requirements, with provisions for locking and sealing.
  - 1. Size: As required by utility.
- B. Meter Base: Furnished by utility company.
- C. Utility Transformer Pad: Prefabricated precast concrete transformer pad sized as required by utility company.

1. Manufacturers:
  - a. NewBasis (Associated Plastics): [www.newbasis.com](http://www.newbasis.com).
  - b. Formex Manufacturing: [www.formex.com](http://www.formex.com).
  - c. Highline Products: [www.highlineproducts.com](http://www.highlineproducts.com).

D. Other Components: As required by utility company.

### **PART 3 EXECUTION**

#### **3.01 PREPARATION**

- A. Arrange with utility company to obtain permanent electric service to the Project.
- B. Verify that field measurements are as indicated on utility company drawings.

#### **3.02 INSTALLATION**

- A. Install service rack, weatherhead, transformer pad, metering transformer cabinets, and meter base as required by utility company.
- B. Install securely, in a neat and workmanlike manner, as specified in NECA 1.

**END OF SECTION**

**SECTION 26 2726  
WIRING DEVICES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Wall switches.
- B. Wall dimmers.
- C. Receptacles.
- D. Device plates and decorative box covers.
- E. Floor box service fittings.
- F. Access floor boxes.

**1.02 RELATED SECTIONS**

- A. Section 26 0533 – Raceways, Fittings and Boxes.

**1.03 REFERENCES**

- A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; 2010.
- B. NEMA WD 1 - General Color Requirements for Wiring Devices; National Electrical Manufacturers Association; 2002 (R 2008).
- C. NEMA WD 6 - Wiring Device -- Dimensional Requirements; National Electrical Manufacturers Association; 2002.
- D. NFPA 70 - National Electrical Code; National Fire Protection Association; 2014.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Submittals, for submittal procedures.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
- C. Manufacturer's Installation Instructions.

**1.05 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Products: Provide products listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Cooper Wiring Devices: [www.cooperwiringdevices.com](http://www.cooperwiringdevices.com).
- B. GE Industrial: [www.geindustrial.com](http://www.geindustrial.com).
- C. Leviton Manufacturing, Inc: [www.leviton.com](http://www.leviton.com).

**2.02 WALL SWITCHES**

- A. Wall Switches: Heavy Duty, AC only general-use snap switch, complying with NEMA WD 6 and WD 1.
  - 1. Body and Handle: White plastic with toggle handle.
  - 2. Indicator Light: Light handle type switch.
  - 3. Locator Light: Lighted handle type switch; red color handle.
  - 4. Ratings:
    - a. Voltage: 120 - 277 volts, AC.



b. Current: 20 amperes.

B. Switch Types: Single pole, double pole, 3-way, 4-way, pilot gang, and locator.

### 2.03 WALL DIMMERS

- A. Wall Dimmers: Semiconductor dimmer for incandescent lamps, Type as indicated on drawings, complying with NEMA WD 6 and WD 1.
1. Body and Handle: White plastic with linear slide.
  2. Voltage: 120 volts.
  3. Power Rating: Match load shown on drawings; 600 watts minimum.
- B. Accessory Wall Switches: Match dimmer appearance.

### 2.04 RECEPTACLES

- A. Receptacles: Heavy duty, industrial type, complying with NEMA WD 6 and WD 1.
1. Device Body: White plastic – Normal power, Red plastic – Emergency power
  2. Configuration: NEMA WD 6, type as specified and indicated.
- B. Convenience Receptacles: Type 5 - 20.
- C. Single Convenience Receptacles.
- D. Duplex Convenience Receptacles.
- E. GFCI Receptacles: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

### 2.05 WALL PLATES

- A. Decorative Cover Plates: White, smooth plastic.
- B. Jumbo Cover Plates: White, smooth plastic.
- C. Weatherproof Cover Plates: Gasketed cast metal with hinged.
- D. Covers for weatherproof receptacles shall be such that the weatherproof integrity of the receptacle is maintained while in use.

### 2.07 FLOOR MOUNTED SERVICE FITTINGS

- A. Pedestal Convenience Receptacles:
1. Housing: Satin aluminum.
  2. Device Plate: Stainless steel.
  3. Configuration: One duplex.
- B. Flush Cover Convenience Receptacles:
1. Material: Brass.
  2. Configuration: Duplex flap opening.
- C. Pedestal Communication Outlets:
1. Housing: Satin aluminum.
  2. Device Plate: Stainless steel.
- D. Flush Cover Communication Outlets:
1. Material: Brass.
  2. Configuration: 2-1/8 inch (54 mm) x 1 inch (25 mm) combination threaded opening.
- E. Pedestal Combination Fittings:
1. Housing: Satin aluminum.
  2. Device Plate: Stainless steel.
  3. Configuration: One duplex convenience receptacle with one bushed opening, 1 inch (25mm) inside diameter.
- F. Flush Cover Combination Fittings:
1. Material: Brass.
  2. Configuration: Duplex flap opening with 2-1/8 inch (54 mm) x 1 inch (25 mm) combination threaded opening.

- G. Protective Ring: Brass finish.
- H. Split Nozzles: Brass finish.
- I. Carpet Rings: Brass.

## **2.08 ACCESS FLOOR BOXES**

- A. Manufacturers:
  - 1. Arc-Co./Division of Arcade Technology: [www.arc-co.com](http://www.arc-co.com).
  - 2. Unity Manufacturing: [www.unitymfg.com](http://www.unitymfg.com).
- B. Floor Boxes: As specified in Section 26 0534.
- C. Access Floor Boxes: Sheet metal box suitable for mounting in access floor system.
  - 1. Size: 4 x 4.
  - 2. Cover: Impact resistant plastic with grey enamel finish.
  - 3. Convenience Receptacle: One with isolated ground.
  - 4. Communications Receptacle: modular jack.
  - 5. Data Receptacle: One.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that outlet boxes are installed at proper height.
- B. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- C. Verify that floor boxes are adjusted properly.
- D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- E. Verify that openings in access floor are in proper locations.

### **3.02 PREPARATION**

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean debris from outlet boxes.

### **3.03 INSTALLATION**

- A. Install securely, in a neat and workmanlike manner, as specified in NECA 1.
- B. Install devices plumb and level.
- C. Install switches with OFF position down.
- D. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.
- E. Do not share neutral conductor on load side of dimmers.
- F. Install receptacles with grounding pole on top.
- G. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.
- H. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
- I. Connect wiring devices by wrapping conductor around screw terminal.
- J. Use jumbo size plates for outlets installed in masonry walls.
- K. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
- L. Install protective rings on active flush cover service fittings.

### **3.04 INTERFACE WITH OTHER PRODUCTS**

- A. Coordinate locations of outlet boxes provided under Section 26 0534 to obtain mounting heights specified and indicated on drawings.
- B. Install wall switch 48 inches (1.2 m) above finished floor.

- C. Install convenience receptacle 18 inches (450 mm) above finished floor.
- D. Install convenience receptacle 6 inches (150 mm) above counter.
- E. Install dimmer 48 inches (1.2 m) above finished floor.
- F. Install telephone jack 18 inches (450 mm) above finished floor.
- G. Install telephone jack for side-reach wall telephone to position top of telephone at 54 inches (1.4 m) above finished floor.
- H. Install telephone jack for forward-reach wall telephone to position top of telephone at 48 inches (1.2 m) above finished floor.
- I. Coordinate the installation of wiring devices with underfloor duct service fittings provided under Section 26 0534.

**3.05 FIELD QUALITY CONTROL**

- A. Inspect each wiring device for defects.
- B. Operate each wall switch with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.
- F. Verify that each telephone jack is properly connected and circuit is operational.

**3.06 ADJUSTING**

- A. Adjust devices and wall plates to be flush and level.

**3.07 CLEANING**

- A. Clean exposed surfaces to remove splatters and restore finish.

**END OF SECTION**

**SECTION 26 2813**  
**FUSES**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Fuses.
- B. Spare fuse cabinet.

**1.02 REFERENCES**

- A. NEMA FU 1 - Low Voltage Cartridge Fuses; National Electrical Manufacturers Association; 2012.
- B. NFPA 70 - National Electrical Code; National Fire Protection Association; 2014.

**1.03 SUBMITTALS**

- A. See Section 01 3000 - Submittals, for submittal procedures.
- B. Product Data: Provide data sheets showing electrical characteristics, including time-current curves.

**1.04 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience and with service facilities within 100 miles (160 km) of Project.
- C. Products: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

**1.05 MAINTENANCE MATERIALS**

- A. See Section 01 6000 - Product Requirements, for additional provisions.
- B. Furnish two fuse pullers.
- C. Furnish three of each size and type fuse installed.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Cooper Bussmann: [www.bussmann.com](http://www.bussmann.com).
- B. Ferraz Shawmut, Inc: [www.ferrazshawmut.com](http://www.ferrazshawmut.com).
- C. Littelfuse: [www.littelfuse.com](http://www.littelfuse.com).

**2.02 FUSES - GENERAL**

- A. Dimensions and Performance: NEMA FU 1, Class as specified or indicated.
- B. Voltage: Rating suitable for circuit phase-to-phase voltage.
- C. Main Service Switches Larger than 600 amperes: Class L (time delay).
- D. Main Service Switches: Class RK1 (time delay).
- E. Power Load Feeder Switches Larger than 600 amperes: Class L (time delay).
- F. Power Load Feeder Switches: Class RK1 (time delay).
- G. Motor Load Feeder Switches: Class RK1 (time delay).
- H. Lighting Load Feeder Switches Larger than 600 amperes: Class L time delay.
- I. Lighting Load Feeder Switches: Class RK1 (time delay).
- J. Other Feeder Switches Larger than 600 amperes: L time delay; L fast-acting.
- K. Other Feeder Switches: Class RK1 (time delay).
- L. General Purpose Branch Circuits: Class RK1 (time delay).

M. Motor Branch Circuits: Class L time delay.

N. Lighting Branch Circuits: Class G.

**2.03 SPARE FUSE CABINET**

A. Description: Wall-mounted sheet metal cabinet with shelves, suitably sized to store spare fuses and fuse pullers specified.

B. Doors: Hinged, with hasp for padlock.

C. Finish: Prime finish for field painting.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

A. Install fuses with label oriented such that manufacturer, type, and size are easily read.

B. Install spare fuse cabinet where indicated.

**END OF SECTION**

**SECTION 26 2816**  
**ENCLOSED SWITCHES AND CIRCUIT BREAKERS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Fusible switches.
- B. Nonfusible switches.

**1.02 RELATED SECTIONS**

- A. Section 26 2813 - Fuses.

**1.03 REFERENCES**

- A. NEMA FU 1 - Low Voltage Cartridge Fuses; National Electrical Manufacturers Association; 2012.
- B. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum); National Electrical Manufacturers Association; 2013.
- C. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; 2003.
- D. NFPA 70 - National Electrical Code; National Fire Protection Association; 2014.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Submittals, for submittal procedures.
- B. Product Data: Provide switch ratings and enclosure dimensions.
- C. Project Record Documents: Record actual locations of enclosed switches.

**1.05 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience and with service facilities within 100 miles (160 km) of Project.
- C. Products: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Eaton Electrical/Cutler-Hammer: [www.eatonelectrical.com](http://www.eatonelectrical.com).
- B. GE Industrial: [www.geindustrial.com](http://www.geindustrial.com).
- C. Square D: [www.squared.com](http://www.squared.com).
- D. Siemens: [www.sea-siemens.com](http://www.sea-siemens.com)

**2.02 COMPONENTS**

- A. Fusible Switch Assemblies: NEMA KS 1, Type HD enclosed load interrupter knife switch.
  - 1. Externally operable handle interlocked to prevent opening front cover with switch in ON position.
  - 2. Handle lockable in OFF position.
  - 3. Fuse clips: Designed to accommodate NEMA FU1, Class R fuses.
- B. Nonfusible Switch Assemblies: NEMA KS 1, Type HD enclosed load interrupter knife switch.
  - 1. Externally operable handle interlocked to prevent opening front cover with switch in ON position.
  - 2. Handle lockable in OFF position.
- C. Enclosures: NEMA KS 1.
  - 1. Interior Dry Locations: Type 1.

2. Exterior Locations: Type 3R.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install fuses in fusible disconnect switches.
- C. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

**3.02 FIELD QUALITY CONTROL**

- A. Inspect and test in accordance with NETA STD ATS, except Section 4.
- B. Perform inspections and tests listed in NETA STD ATS, Section 7.5.

**END OF SECTION**

**SECTION 26 5600**  
**EXTERIOR LUMINAIRES**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Exterior luminaires and accessories.
- B. Poles.

**1.02 RELATED SECTIONS**

- A. Section 03 3000 - Cast-in-Place Concrete: Foundations for poles.

**1.03 REFERENCES**

- A. ANSI C78.379 - American National Standard for Electric Lamps -- Reflector Lamps -- Classification of Beam Patterns; 2006.
- B. ANSI C82.1 - American National Standard for Lamp Ballast - Line Frequency Fluorescent Lamp Ballast; 2014.
- C. ANSI C82.4 - American National Standard for Ballasts for High-Intensity-Discharge and Low Pressure Sodium Lamps (Multiple-Supply Type); 2002.
- D. ANSI O5.1 - American National Standard for Wood Poles -- Specifications and Dimensions; 2002.
- E. IESNA RP-8 - American National Standard Practice for Roadway Lighting; Illuminating Engineering Society of North America; 2000 (ANSI/IES RP8).
- F. NECA/IESNA 501 - Recommended Practice for Installing Exterior Lighting Systems; 2006.
- G. NFPA 70 - National Electrical Code; National Fire Protection Association; 2014.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Submittals, for submittal procedures.
- B. Shop Drawings: Indicate dimensions and components for each luminaire which is not a standard product of the manufacturer.
- C. Product Data: Provide dimensions, ratings, and performance data.
- D. Test Reports: Indicate measured illumination levels.
- E. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.
- F. Maintenance Data: For each luminaire.

**1.05 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Electrical Components: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store and handle solid wood poles in accordance with ANSI O5.1.

**1.07 COORDINATION**

- A. Furnish bolt templates and pole mounting accessories to installer of pole foundations.

**PART 2 PRODUCTS****2.01 LUMINAIRES**

- A. Furnish products as indicated in Schedule included on the Drawings.



- B. Substitutions: See Section 01 6000 - Product Requirements.

## 2.02 BALLASTS

- A. Fluorescent Ballasts: ANSI C82.1, high power factor type electromagnetic ballast, suitable for lamps specified.
  - 1. Provide low-temperature ballast suitable for lamps specified.
  - 2. Voltage: 120 or 277 volts or match luminaire voltage.
  - 3. Certify fluorescent ballast design and construction by Certified Ballast Manufacturers, Inc.
  - 4. Product:
  - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. High Intensity Discharge (HID) Ballasts: ANSI C82.4, mercury vapor, metal halide, low pressure sodium lamp ballast, suitable for lamp specified.
  - 1. Voltage: Match luminaire voltage.
  - 2. Product:
  - 3. Substitutions: See Section 01 6000 - Product Requirements.

## 2.03 LAMPS

- A. Manufacturers:
  - 1. GE Lighting: [www.gelighting.com](http://www.gelighting.com).
  - 2. Philips Lighting Co of NA: [www.lighting.philips.com](http://www.lighting.philips.com).
  - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Lamp Types: As specified for each luminaire.

## 2.04 POLES

- A. Manufacturers:
  - 1. Furnish products as indicated on the drawings.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install fixtures securely, in a neat and workmanlike manner, as specified in NECA 501.
- B. Provide concrete bases for lighting poles at locations indicated, in accordance with Section 03 3000.
- C. Install poles plumb.
  - 1. Provide double nuts to adjust plumb.
  - 2. Grout around each base.
- D. Install lamps in each luminaire.
- E. Bond luminaires, metal accessories, and metal poles to branch circuit equipment grounding conductor. Provide supplementary grounding electrode at each pole.

### 3.02 FIELD QUALITY CONTROL

- A. Operate each luminaire after installation and connection. Inspect for improper connections and operation.
- B. Measure illumination levels to verify conformance with performance requirements. Take measurements during night sky, without moon or with heavy overcast clouds effectively obscuring moon.

### 3.03 ADJUSTING

- A. Aim and adjust luminaires to provide illumination levels and distribution indicated on Drawings.

### 3.04 CLEANING

- A. Clean electrical parts to remove conductive and deleterious materials.
- B. Remove dirt and debris from enclosure.
- C. Clean photometric control surfaces as recommended by manufacturer.
- D. Clean finishes and touch up damage.

**3.05 PROTECTION OF FINISHED WORK**

- A. Relamp luminaires which have failed lamps at Substantial Completion.

**END OF SECTION**

**SECTION 31 1000  
SITE CLEARING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Removal of existing debris.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- B. Section 01 5713 - Temporary Erosion Control.
- C. Section 01 7000 - Execution Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.
- D. Section 01 7419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
- E. Section 31 2200 - Grading: Topsoil removal.
- F. Section 31 2323 - Fill and Backfill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

**1.03 PROJECT CONDITIONS**

- A. Conform to applicable regulations relating to environmental requirements, disposal of debris and use of herbicides.
- B. Coordinate clearing work with utility companies.
- C. Protect bench marks, survey control points, and existing structures from damage or displacement.

**PART 2 PRODUCTS**

-- NOT APPLICABLE --

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Locate and identify utilities to remain.

**3.02 PROTECTION**

- A. Tag existing plants designated to remain.
- B. Protect utilities that remain, from damage.
- C. Protect bench marks and lot corner monumentation from damage or displacement.

**3.03 SITE CLEARING**

- A. Comply with other requirements specified in Section 01 7000 - "Execution Requirements".
- B. Clear areas required for access to site and execution of work.
- C. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- D. Remove trees, shrubs and stumps indicated.
- E. Clear undergrowth and deadwood without disturbing subsoil.

**3.04 EXISTING UTILITIES AND BUILT ELEMENTS**

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.

- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Protect existing structures and other elements that are not to be removed.

**3.05 DEBRIS**

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**

**SECTION 31 2200**  
**GRADING**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Removal of topsoil.
- B. Rough grading the site for site structures, building pads, and parking areas..
- C. Finish grading.

**1.02 RELATED REQUIREMENTS**

- A. Section 31 1000 - Site Clearing.
- B. Section 31 2316 - Excavation.
- C. Section 31 2323 - Fill and Backfill: Filling and compaction.

**1.03 SUBMITTALS**

- A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

**1.04 QUALITY ASSURANCE**

- A. Perform Work in accordance with the plans and these specifications.

**PART 2 PRODUCTS****2.01 MATERIALS**

- A. Topsoil: Topsoil excavated on-site.
  - 1. Graded.
  - 2. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.
- B. Other Fill Materials: See Section 31 2323.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.

**3.02 PREPARATION**

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect from damage above- and below-grade utilities to remain.

**3.03 ROUGH GRADING**

- A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
- B. Do not remove topsoil when wet.
- C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
- D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.
- E. When excavating through roots, perform work by hand and cut roots with sharp axe.
- F. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

**3.04 SOIL REMOVAL**

- A. Stockpile excavated topsoil on site.
- B. Stockpile excavated subsoil on site.
- C. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

**3.05 FINISH GRADING**

- A. Before Finish Grading:
  - 1. Verify building and trench backfilling have been inspected.
  - 2. Verify subgrade has been contoured and compacted.
- B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.
- C. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.
- D. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

**3.06 TOLERANCES**

- A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) from required elevation.
- B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch).

**3.07 FIELD QUALITY CONTROL**

- A. See Section 31 2323 for compaction density testing.

**3.08 CLEANING**

- A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.
- B. Leave site clean and raked, ready to receive landscaping.

**END OF SECTION**

**SECTION 31 2316  
EXCAVATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Excavating for footings, slabs-on-grade, and site structures.
- B. Trenching for utilities outside the building to utility main connections.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 57 13 - Temporary Erosion Control.
- B. Section 01 7000 - Execution Requirements: General requirements for dewatering of excavations and water control.
- C. Section 31 2200 - Grading: Soil removal from surface of site.
- D. Section 31 2323 - Fill and Backfill: Fill materials, filling, and compacting.

**PART 2 PRODUCTS**

-- NOT APPLICABLE --

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 2200 for additional requirements.
- C. Locate, identify, and protect utilities that remain and protect from damage.

**3.02 EXCAVATING**

- A. Excavate to accommodate new structures and construction operations.
- B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Cut utility trenches wide enough to allow inspection of installed utilities.
- E. Hand trim excavations. Remove loose matter.
- F. Remove excess excavated material from site.

**3.03 FIELD QUALITY CONTROL**

- A. See Section 01 4500 - "Quality Control", for general requirements for field inspection and testing.
- B. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

**3.04 PROTECTION**

- A. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
- B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

**END OF SECTION**

**SECTION 31 2323  
FILL AND BACKFILL**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Filling, backfilling, and compacting for site grading and footings, slabs-on-grade, and site structures.
- B. Backfilling and compacting for utilities outside the building to utility main connections.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 5713 - Temporary Erosion Control: Slope protection and erosion control.
- B. Section 03 3000 - Cast-in-Place Concrete.
- C. Section 31 22 00 - Grading: Site grading.
- D. Section 31 2316 - Excavation: Removal and handling of soil to be re-used.
- E. Section 32 13 13 - Portland Cement Concrete Paving: Leveling bed placement under paving.

**1.03 REFERENCE STANDARDS**

- A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; 2010.
- B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup> (600 kN-m/m<sup>3</sup>)); 2012.
- C. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.
- D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft<sup>3</sup> (2,700 kN m/m<sup>3</sup>)); 2012.
- E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2008.
- F. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.
- G. ASTM D2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 2005.
- H. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.

**1.04 DEFINITIONS**

- A. Finish Grade Elevations: Indicated on drawings.
- B. Subgrade Elevations: 4 inches below finish grade elevations indicated on drawings, unless otherwise indicated.

**1.05 SUBMITTALS**

- A. See Section 01 3000 - "Submittals", for submittal procedures.
- B. Materials Sources: Submit name of imported materials source.
- C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.
- D. Compaction Density Test Reports.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. When necessary, store materials on site in advance of need.
- B. When fill materials need to be stored on site, locate stockpiles where indicated.
  - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
  - 2. Prevent contamination.



3. Protect stockpiles from erosion and deterioration of materials.
- C. Verify that survey bench marks and intended elevations for the Work are as indicated.

## **PART 2 PRODUCTS**

### **2.01 FILL MATERIALS**

- A. General Fill: Subsoil excavated on-site.
  1. Graded.
  2. Free of lumps larger than 3 inches, rocks larger than 6 inches, and debris.
  3. Conforming to ASTM D2487 Group Symbol CL, or as approved by the Soils Engineer.
- B. Structural Fill: Subsoil excavated on-site.
  1. Graded.
  2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
  3. Conforming to ASTM D2487 Group Symbol CL.
- C. Concrete for Fill: Lean concrete, 1 or 2 sack slurry.
- D. Granular Fill: Coarse aggregate, conforming to State of California Department of Transportation standard.
- E. Sand: Conforming to State of California Department of Transportation standard.
- F. Sand in the pipe zone shall have a sand equivalent greater than 30.

### **2.02 ACCESSORIES**

- A. Geotextile Fabric: Non-biodegradable, woven, Structural Geogrid BX1200; manufactured by Tensar Earth Technologies, Inc., or approved equal by Architect; submittal required.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 2200 for additional requirements.
- C. Verify underground tanks are anchored to their own foundations to avoid flotation after backfilling.

### **3.02 PREPARATION**

- A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

### **3.03 FILLING**

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.
- F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.
- G. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- H. Correct areas that are over-excavated.

1. Other areas: Use general fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.
- I. Compaction Density Unless Otherwise Specified or Indicated:
  1. Under paving, slabs-on-grade, and similar construction: 95 percent of maximum dry density.
- J. Reshape and re-compact fills subjected to vehicular traffic.

**3.04 FIELD QUALITY CONTROL**

- A. See Section 01 45 00 - "Quality Control", for general requirements for field inspection and testing.
- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017.
- C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor"), ASTM D1557 ("modified Proctor"), or AASHTO T 180.
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

**3.05 CLEANING**

- A. See Section 01 7419 - Construction Waste Management and Disposal, for additional requirements.
- B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
- C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

**END OF SECTION**

**SECTION 32 1313  
CONCRETE PAVING**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Concrete sidewalks, integral curbs, gutters, and parking areas.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-in-Place Concrete.
- B. Section 07 9005 - Joint Sealers: Sealant for joints.
- C. Section 31 2200 - Grading: Preparation of site for paving and base and preparation of subsoil at pavement perimeter for planting.
- D. Section 31 2323 - Fill and Backfill: Compacted subbase for paving.

**1.03 REFERENCE STANDARDS**

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
- B. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
- C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000.
- D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.
- E. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2015a.
- F. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2015.
- G. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.
- H. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2013.
- I. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2013).
- J. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2004a (Reapproved 2013).

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on joint filler and curing compound.

**PART 2 PRODUCTS****2.01 AGGREGATE BASE**

- A. Aggregate Base Course: Thickness and size of aggregate as indicated on the drawings.

**2.02 FORM MATERIALS**

- A. Wood form material, profiled to suit conditions.

**2.03 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) yield strength; deformed billet steel bars; unfinished.

**2.04 CONCRETE MATERIALS**

- A. Obtain cementitious materials from same source throughout.
- B. Concrete Materials: As specified in Section 03 3000.

- C. Fiber Reinforcement: Synthetic fibers shown to have long-term resistance to deterioration when in contact with alkalis and moisture; 1/2 inch length.
- D. Admixtures: Fly ash is not allowed.

## **2.05 ACCESSORIES**

- A. Curing Compound: ASTM C309, Type 1, Class A.
- B. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
  - 1. Material: ASTM D1751, cellulose fiber.

## **2.06 CONCRETE MIX DESIGN**

- A. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
  - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- B. Fiber Reinforcement: Add to mix at rate of 1.5 pounds per cubic yard, or as recommended by manufacturer for specific project conditions.
- C. Concrete Properties:
  - 1. Compressive strength, when tested in accordance with ASTM C39/C39M at 28 days; 4,500 psi.

## **2.07 MIXING**

- A. Transit Mixers: Comply with ASTM C94/C94M.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.
- C. Verify base conditions.

### **3.02 PREPARATION**

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Notify Architect minimum 24 hours prior to commencement of concreting operations.

### **3.03 FORMING**

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

### **3.04 PLACING CONCRETE**

- A. Place concrete in accordance with ACI 304R.
- B. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.
- C. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

### **3.05 JOINTS**

- A. Place 3/8 inch wide expansion joints at 50 foot intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
- B. Saw cut contraction joints 3/16 inch wide at an optimum time after finishing. Cut 1/3 into depth of slab.

**3.06 FINISHING**

- A. Area Paving: Light broom, texture perpendicular to pavement direction.
- B. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.
- C. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

**3.07 JOINT SEALING**

- A. See Section 07 9005 for joint sealer requirements.
- B. Joint Sealant:
  - 1. Surface Preparation: All joints must be absolutely clean. For concrete, sandblasting is required. All curing compounds, old caulks, waterproofing compounds, etc., must be removed. Polyethylene rod or polyurethane foam is recommended as a joint-filler and backup material. Fillers treated with bituminous products, grease or oil, should not be used. Where present, they must be removed or separated by vinyl tape or polyethylene film. All surfaces must be primed with ELASTO-THANE PRIMER.
  - 2. Application: Apply by caulking gun, hand or pressure type, or pour from container. Bulk sealant can be applied by pumping equipment, trowel or putty knife. Press firmly into joint to assure good contact.

**3.08 FIELD QUALITY CONTROL**

- A. Field Inspection and testing will be performed under provisions of Section 01 4500 - "Quality Control".
- B. Testing firm will take cylinders and perform slump tests in accordance with ACI 301.

**3.09 PROTECTION**

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

**END OF SECTION**

**SECTION 32 1713  
WHEEL STOPS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Precast concrete parking bumpers and anchorage.

**1.02 REFERENCE STANDARDS**

- A. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.
- B. ASTM C150/C150M - Standard Specification for Portland Cement; 2015.
- C. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.
- D. ASTM C330/C330M - Standard Specification for Lightweight Aggregates for Structural Concrete; 2014.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Parking Bumpers: Precast concrete, conforming to the following:
  - 1. Nominal Size: 5 inches high, 9 inches wide, 6 feet long.
  - 2. Cement: ASTM C150/C150M, Portland Type I - Normal; white color.
  - 3. Concrete Materials: ASTM C330/C330M aggregate, water, and sand.
  - 4. Reinforcing Steel: ASTM A615/A615M, deformed steel bars; unfinished, strength and size commensurate with precast unit design.
  - 5. Air Entrainment Admixture: ASTM C260/C260M.
  - 6. Concrete Mix: Minimum 5,000 psi compressive strength after 28 days, air entrained to 5 to 7 percent.
  - 7. Use rigid molds, constructed to maintain precast units uniform in shape, size and finish. Maintain consistent quality during manufacture.
  - 8. Embed reinforcing steel, and drill or sleeve for two dowels.
  - 9. Cure units to develop concrete quality, and to minimize appearance blemishes such as non-uniformity, staining, or surface cracking.
  - 10. Minor patching in plant is acceptable, providing appearance of units is not impaired.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install units without damage to shape or finish. Replace or repair damaged units.
- B. Install units in alignment with adjacent work.
- C. Fasten units in place with 2 dowels per unit.

**END OF SECTION**

**SECTION 32 1726**  
**TACTILE WARNING SURFACING**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Plastic tactile and detectable warning tiles for pedestrian walking surfaces.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete for sidewalks and platforms.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ASTM C501 - Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser; 1984 (Reapproved 2009).
- C. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine; 2011.
- D. ASTM C1028 - Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method; 2007e1.
- E. ASTM D638 - Standard Test Method for Tensile Properties of Plastics; 2014.
- F. ASTM D695 - Standard Test Method for Compressive Properties of Rigid Plastics; 2010.
- G. ASTM D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 2010.
- H. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes; 2002 (Reapproved 2013).

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's product data, standard details, details specific to this project; written installation and maintenance instructions.
- C. Samples: For each product specified provide two samples, 8 inches square, minimum; show actual product, color, and patterns.
- D. Shop Drawings: Submit plan and detail drawings. Indicate:
  - 1. Locations on project site. Demonstrate compliance with referenced accessibility standards.
  - 2. Sizes and layout.
  - 3. Pattern spacing and orientation.
  - 4. Attachment and fastener details, if applicable

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years documented experience.
- B. Installer Qualifications: Company certified in writing by product manufacturer as having successfully completed work substantially similar to the work of this section.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Plastic Tactile and Detectable Warning Surface Tiles:
  - 1. Armor-Tile, a brand of Engineered Plastics, Inc: [www.armortiletransit.com](http://www.armortiletransit.com).
  - 2. Substitutions: See Section 01 6000 - PRODUCT REQUIREMENTS.

## 2.02 TACTILE AND DETECTABLE WARNING DEVICES

- A. Plastic Tactile and Detectable Warning Tiles: ADA Standards compliant, glass fiber and carbon fiber reinforced, exterior grade, matte finish polyester sheet with truncated dome pattern, solid color throughout, internal reinforcing of sheet and of truncated domes, integral radius cut lines on back face of tile; with factory applied removable protective sheeting.
1. Material Properties:
    - a. Water Absorption: 0.20 percent, maximum, when tested in accordance with ASTM D570.
    - b. Slip Resistance: 0.50 minimum dry static coefficient of friction, when tested in accordance with ASTM D2047.
    - c. Compressive Strength: 25,000 pounds per square inch, minimum, when tested in accordance with ASTM D695.
    - d. Tensile Strength: 10,000 pounds per square inch, minimum, when tested in accordance with ASTM D638.
    - e. Flexural Strength: 25,000 pounds per square inch minimum, when tested in accordance with ASTM D790.
    - f. Chemical Stain Resistance: No reaction to 1 percent hydrochloric acid, motor oil, calcium chloride, gum, soap solution, bleach, or antifreeze, when tested in accordance with ASTM D543.
    - g. Chemical Stain Resistance: No reaction to 1 percent hydrochloric acid, motor oil, calcium chloride, gum, soap solution, bleach, or antifreeze, when tested in accordance with ASTM D1308.
    - h. Abrasion Resistance: 300, minimum, when tested in accordance with ASTM C501.
    - i. Flame Spread Index: 25, maximum, when tested in accordance with ASTM E84.
    - j. Accelerated Weathering: Delta-E of less than 5.0 at 2,000 hours exposure, when tested in accordance with ASTM G155.
  2. Shape: Rectangular.
  3. Dimensions: 36 inches by 48 inches.
  4. Pattern: In-line pattern of truncated domes complying with ADA Standards.
  5. Color: FED-STD-595C, Table IV, Federal Yellow No. 33538.

## 2.03 ACCESSORIES

- A. Fasteners: ASTM A666, Type 304 stainless steel
1. Type: Countersunk, color matched composite sleeve anchors
  2. Size: 1/4 inch diameter and 1-1/2 inches long.
- B. Adhesive: Type recommended and approved by surfacing tile manufacturer.
- C. Sealant: Elastomeric sealant of color to match adjacent surfaces; approved by surfacing tile manufacturer.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. When installation location is near site boundary or property line, verify required location using property survey.
- B. Verify that work area is ready to receive work:
1. If existing conditions are not as required to properly complete the work of this section, notify Architect.
  2. Do not proceed with installation until deficiencies in existing conditions have been corrected.
- C. Verify that dimensions, tolerances, and attachment methods for work in this section are properly coordinated with other work on site.

### 3.02 INSTALLATION, GENERAL

- A. Install in accordance with manufacturer's written instructions.
1. Do not install damaged, warped, bowed, dented, abraded, or otherwise defective units.



2. Do not install when ambient or substrate temperature has been below 40 degrees F during the preceding 8 daylight hours.
- B. Field Adjustment:
  1. Cut units to size and configuration shown on drawings.
  2. Do not cut plastic tiles to less than 9 inches wide in any direction.
  3. Locate relative to curb line in compliance with ATBCB PROWAG, Sections 304 and 305.
  4. Orient so dome pattern is aligned with the direction of ramp.
  5. Align truncated dome pattern between adjacent units.
- C. Install units fully seated to substrate, square to straight edges and flat to required slope.
- D. Align units so that tops of adjacent units are flush and joints between units are uniform in width.

### **3.03 INSTALLATION, SURFACE APPLIED PLASTIC TILES**

- A. Cure concrete surfaces for a minimum of 4 days before installing units.
- B. When installing multiple adjacent units, leave a 1/8 inch gap between tiles to allow for expansion.
- C. Drill fastener holes straight, true and to depth recommended by manufacturer.
- D. Apply adhesive to back of unit as recommended by manufacturer.
- E. Mechanically fasten to substrate. Avoid striking or damaging the unit itself during installation.
- F. Apply sealant to edges in cove profile.

### **3.04 CLEANING PLASTIC UNITS**

- A. Remove protective plastic sheeting within 24 hours of installation.
- B. Remove excess sealant or adhesive from joints and edges.
- C. Clean four days prior to date of scheduled inspection.
- D. Clean 4 days prior to date of scheduled inspection.

### **3.05 PROTECTION**

- A. Protect installed units from traffic, subsequent construction operations or other imposed loads until concrete is fully cured.
- B. Touch-up, repair or replace damaged products prior to Date of Substantial Completion.

**END OF SECTION**

**SECTION 33 3413  
SEPTIC TANKS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Septic tank, distribution box, and filter drainage field system.

**1.02 RELATED REQUIREMENTS**

- A. Section 31 2316 - Excavation: General requirements for trenching for drainage field and connecting piping.
- B. Section 31 2323 - Fill and Backfill: General requirements for backfilling piping trenches including compaction testing.

**1.03 REFERENCE STANDARDS**

- A. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings; 2016.
- B. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2011.

**1.04 SUBMITTALS**

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Manufacturer's Installation Instructions: Indicate special procedures for septic tank installation.
- C. Project Record Documents: Accurately record actual locations and inverts of buried pipe, components, and connections.

**1.05 QUALITY ASSURANCE**

- A. Conform to applicable code and regulations for work of this section.
- B. Provide certificate of compliance from authority having jurisdiction indicating approval of systems.

**PART 2 PRODUCTS****2.01 SEPTIC TANK AND DISTRIBUTION BOX**

- A. Manufacturers:
  - 1. Jensen Precast; -: [www.jensenprecast.com](http://www.jensenprecast.com).
  - 2. Substitutions: See Section 01 6000 - PRODUCT REQUIREMENTS.
- B. Septic Tank: Reinforced precast concrete construction, 4,000 psi 28 day minimum strength, concrete partitioned chambers, concrete lid with lift rings, vent, inlet inspection hole, inlet turned down minimum 12 inches below effluent level.
- C. Distribution Box: Reinforced concrete, single inlet, two outlets, gate, removable cover with lift ring.

**2.02 CONNECTING PIPE MATERIALS**

- A. Cast Iron Pipe Type \_\_\_\_: ASTM A74 extra heavy grade, hub and spigot joint; nominal inside diameter of \_\_\_\_ inch:
- B. Plastic Pipe (PVC): ASTM D2729; nominal inside diameter of \_\_\_\_ inch, bell and spigot solvent sealed joints.
- C. Fittings: Same material as pipe, tee bends, elbows, cleanouts, reducers, ends to suit pipe joint.

**2.03 FILTER DRAIN PIPE MATERIALS**

- A. Plastic Pipe (PVC): ASTM D2729; plain end, nominal inside diameter of \_\_\_\_ inch.
- B. Use perforated pipe at filter field system; unperforated through sleeves and at junction with distribution box.

**2.04 BEDDING AND BACKFILL MATERIALS**

- A. Provide bedding and backfill materials as specified in Section 31 2323 and as follows:

- B. Tank Bedding Material: Granular fill.
- C. Tank Backfill Material: Granular fill.
- D. Connecting Piping Bedding Material: Granular fill.
- E. Connecting Piping Backfill Material: Granular fill.
- F. Filter Drain Bedding Material: Granular fill.
- G. Filter Drain Cover Material: Granular fill.

**PART 3 EXECUTION**

**3.01 EXCAVATING AND TRENCHING**

- A. See Section 31 2316 and Section 31 2323 for general requirements.

**3.02 TANK INSTALLATION**

- A. Hand trim excavation for accurate placement of tank to elevations indicated.
- B. Place bedding material level in one continuous layer not exceeding 6 inches compacted depth, compact to 95 percent.
- C. Install septic tank and distribution box and related components on bedding in accordance with manufacturer's instructions.
- D. Backfill around sides of tank, tamped in place and compacted to 95 percent.

**3.03 CONNECTING PIPING INSTALLATION**

- A. Connect outlet between building sanitary piping and septic tank, between septic tank and distribution box, between distribution box and filter field header.
- B. Slope piping to each successive component, minimum of 1/4 inch per foot.
- C. Cover pipe with backfill, sides and top. Place geotextile fabric over cover prior to backfilling.

**3.04 PROTECTION**

- A. Do not permit vehicular traffic over drainage field.

**END OF SECTION**