

Attachment B

This page intentionally left blank.

MONTEREY COUNTY
RESOURCE MANAGEMENT AGENCY

PUBLIC WORKS, PARKS & FACILITIES

VOLUME ONE OF TWO

PROJECT MANUAL

855 EAST LAUREL DRIVE-EMERGENCY SHELTER
PROJECT NO. 8875
BID NO. 10736



TITLE SHEET

BOARD OF SUPERVISORS
COUNTY OF MONTEREY
STATE OF CALIFORNIA

John M. Phillips, Chair
Mary L. Adams
Luis A. Alejo
Chris Lopez
Jane Parker

Lew C. Bauman, P.E., Ph.D. County Administrative Officer
Carl P. Holm, A.I.C.P. Resource Management Agency Director

Approved as to Form

Approved as to Indemnity/
Insurance Language

Approved as to Fiscal Terms

Office of the County Counsel-
Risk Management,
County Counsel-Risk Manager,
Charles J. McKee

By: Mary Grace Perry
Mary Grace Perry
Deputy County Counsel

Date: 8-7-2019

Office of the County Counsel-
Risk Management,
County Counsel-Risk Manager,
Charles J. McKee

By: Leslie J. Girard
Leslie J. Girard, Chief Assistant

Date: 8/8/19

Rupa Shah,
County Auditor-Controller

By: [Signature]
Chief Deputy Auditor-Controller

Date: 8-8-19

**855 EAST LAUREL DRIVE-EMERGENCY SHELTER
PROJECT NO. 8875 BID NO. 10736**

The current General Prevailing Wage determined by the State of California Director of Industrial Relations is on file with the Monterey County Resource Management Agency (RMA)

1441 SCHILLING PLACE, SECOND FLOOR
SALINAS, CALIFORNIA 93901
(831) 755-4800

TABLE OF CONTENTS

	COVER
TS	TITLE SHEET
TOC	TABLE OF CONTENTS
SS	SIGNATURE SHEET
PC	PROJECT CONTACTS

DIVISION 00 – PROJECT MANUAL PROCUREMENT REQUIREMENTS/CONTRACTS & PURCHASING

002000	Instructions to Bidders
003000	Bid Form
003500	List of Subcontractors
004000	Non-Collusion Declaration
004100	Contractor’s Certificate as to Workers’ Compensation
004200	Iran Contracting Act Certification
004300	Contractor’s Certification of Good-Faith Effort to Employ Monterey Bay Area Residents
004400	Bid Bond
004516	Bidder Certifications
005000	Agreement
006000	Performance Bond
006100	Payment Bond
006200	Withheld Contract Funds Certifications
006290	Escrow Agreement for Security Deposits in Lieu of Retention
006536	Guaranty
007100	General Conditions
	<u>Part I – Introduction</u>
	Article 1 – Definitions
	Article 2 – Contract Interpretation
	Article 3 – Contract Documents
	Article 4 – Subcontractors
	Article 5 – Drawings and Specifications
	<u>Part II – Conduct of Work</u>
	Article 6 – Contract Administration by Architect & Construction Manager
	Article 7 – Services Provided by County
	Article 8 – Owner’s Administration of Work
	Article 9 - Contractor’s Administrative Duties
	Article 10 – General Provisions Regarding Conduct of Work
	Article 11 – Shop Drawings and Samples
	Article 12 – Separate Contracts on Same Project
	Article 13 – Tests
	Article 14 – Contractor’s Prosecution and Progress of the Work
	Article 15 – Time for Performance and Liquidated Damages
	Article 16 – Use of Site
	Article 17 – Materials
	Article 18 – Changes in the Work
	Article 19 – Uncovering and Correction of Work
	<u>Part III – Safety</u>
	Article 20 – Protection of Persons and Property
	<u>Part IV – Payments</u>
	Article 21 – Progress Payments
	Article 22 – Withholding Payments
	Article 23 – Completion and Final Payment
	Article 24 – Alternative Payment of Withheld Funds
	<u>Part V – Employment Practices</u>
	Article 25 – Apprentices
	Article 26 – Non-Discrimination Provisions
	Article 27 – Hours of Work
	Article 28 – Prevailing Wages
	Article 29 – Payroll Records
	<u>Part VI – Legal Relations</u>
	Article 30 – Compliance with Laws

Article 31 – Performance and Payment Bonds
Article 32 – Indemnification and Insurance
Article 33 – Claims and Dispute Resolution
Article 34 – Default and Termination of Contract
Article 35 – Warranties
Part VII – Miscellaneous
Article 36 – Miscellaneous Provisions

007300 Supplementary Conditions

SEPARATE COVER DOCUMENTS

Notice To Bidders
Project Manual Volume Two of Two
Construction Drawings

No.	SHEET TITLE
ARCHITECTURAL	
A0.1	TITLE SHEET
A1.0	OVERALL SITE PLAN
A1.1	EXISTING & DEMO SITE PLAN
A1.2	ENLARGED SITE PLAN
A1.3	SITE DETAILS
A1.4	SITE DETAILS
A1.5	SITE DETAILS
A1.6	SITE DETAILS
A1.7	SITE DETAILS
A2.1	FLOOR PLAN
A2.2	FURNITURE PLAN – FOR REFERENCE ONLY
A2.3	EQUIPMENT PLATFORM PLAN
A2.4	DIMENSION PLAN
A2.5	EGRESS PLAN
A2.6	FINISH PLAN
A2.7	REFLECTED CEILING PLAN
A2.8	ROOF PLAN
A3.1	EXTERIOR ELEVATIONS
A4.1	BUILDING SECTIONS
A5.1	ENLARGED KITCHEN PLAN & INTERIOR ELEVATIONS
A5.2	ENLARGED RESTROOM PLANS & INTERIOR ELEVATIONS
A5.3	ENLARGED PLANS & INTERIOR ELEVATIONS
A5.4	INTERIOR ELEVATIONS
A6.1	DOOR SCHEDULE
A6.2	WINDOW SCHEDULE
A6.3	GATE SCHEDULE
A6.4	DOOR & WINDOW DETAILS
A7.1	WALL TYPES & DETAILS
A9.1	CEILING DETAILS
A9.2	CABINET DETAILS
A9.3	MISC DETAILS
A9.4	MISC DETAILS
A9.5	MISC DETAILS
CIVIL	
C1.0	SITE TOPOGRAPHIC MAP & DEMOLITION PLAN
C1.1	OVERALL DRAINAGE & UTILITY PLAN
C1.2	SITE GRADING AND DRAINAGE PLAN
C1.3	GRADING SECTIONS & DETAILS
C1.4	STORM WATER CONTROL PLAN
C1.5	EROSION & SEDIMENT CONTROL PLAN
C1.6	EROSION CONTROL NOTES & DETAILS
STRUCTURAL	
S0.1	GENERAL NOTES
S1.1	FOUNDATION PLAN
S1.2	CEILING FRAMING PLAN
S1.3	ROOF FRAMING PLAN
S2.0	CONCRETE DETAILS
S2.1	CONCRETE DETAILS
S4.0	LIGHT GAUGE STEEL
S4.1	LIGHT GAUGE STEEL
MECHANICAL	
M-0.1	MECHANICAL: GENERAL NOTES
M-1.1	MECHANICAL: SCHEDULES

M-1.2	MECHANICAL: SCHEDULES
M-1.3	MECHANICAL: SCHEDULES
M-2.1	MECHANICAL: FIRST FLOOR PLAN
M-2.2	MECHANICAL: EQUIPMENT PLATFORM PLAN
M-2.3	MECHANICAL: ROOF PLAN
M-3.1	MECHANICAL: KICTHEN HOOD
M-3.2	MECHANICAL: KICTHEN HOOD
M-3.3	MECHANICAL: KICTHEN HOOD
M-3.4	MECHANICAL: KICTHEN HOOD
M-3.5	MECHANICAL: KICTHEN HOOD
M-3.6	MECHANICAL: KICTHEN HOOD
M-3.7	MECHANICAL: KICTHEN HOOD
M-3.8	MECHANICAL: KICTHEN HOOD
M-3.9	MECHANICAL: KICTHEN HOOD
T24.1	MECHANICAL: TITLE 24
T24.2	MECHANICAL: TITLE 24
T24.3	MECHANICAL: TITLE 24
T24.4	MECHANICAL: TITLE 24
PLUMBING	
P0.1	PLUMBING: TITLE SHEET
P0.2	PLUMBING: CALCULATIONS
P0.3	PLUMBING: DETAILS
P0.4	PLUMBING: DETAILS
P1.0	PLUMBING: GAS SITE PLAN
P2.0	PLUMBING: UNDERFLOOR PLAN
P2.1	PLUMBING: FLOOR PLAN
P2.2	PLUMBING: EQUIPMENT PLATFORM PLAN
P2.3	PLUMBING: ROOF PLAN
P3.1	PLUMBING: PARTIAL FLOOR PLANS
ELECTRICAL	
E0.1	SYMBOLS, ABBREV., CODES, STANDARDS & SHEET INDEX
E0.2	LIGHT FIXTURE SCHEDULE, GENERAL CONSTRUCTION & DEMOLITION NOTES
E0.3	CALIFORNIA ENERGY COMPLIANCE TITLE 24 – INDOOR
E0.4	CALIFORNIA ENERGY COMPLIANCE TITLE 24 – OUTDOOR
E0.5	CALIFORNIA ENERGY COMPLIANCE TITLE 24
E1.1	ELECTRICAL SINGLE LINE DIAGRAM & DETAILS
E1.2	PANELBOARD SCHEDULES
E2.1	ELECTRICAL SITE PLAN
E4.1	POWER & SYSTEMS PLAN
E4.2	POWER & SYSTEMS PLAN – EQUIPMENT PLATFORM
E4.3	POWER & SYSTMES PLAN – KITCHEN
E5.1	LIGHTING PLAN
E5.2	LIGHTING PLAN – EQUIPMENT PLATFORM
E6.1	ELECTRICAL DETAILS
E6.2	ELECTRICAL DETAILS
E6.3	ELECTRICAL DETAILS
E6.4	ELECTRICAL DETAILS
LANDSCAPE	
L1.1	LANDSCAPE PLAN
L1.2	HARDSCAPE PLAN
L2.1	IRRIGATION PLAN
L3.1	LANDSCAPE DETAILS

SIGNATURE SHEET

PROJECT MANUAL

855 EAST LAUREL DRIVE-EMERGENCY SHELTER
PROJECT NO. 8875 BID NO. 10736

The drawings and specifications were prepared by Weston Miles Architects, under the direct supervision of Lesley Miles

Signature

Date



07/31/2019

Affix stamp below



NOT VALID WITHOUT WET SIGNATURE

PROJECT CONTACTS

**855 EAST LAUREL DRIVE-EMERGENCY SHELTER
PROJECT NO. 8875
BID NO. 10736**

OWNER

COUNTY OF MONTEREY
RESOURCE MANAGEMENT AGENCY
PUBLIC WORKS, PARKS & FACILITIES
ATTN: DAVE PRATT, PROJECT MANAGER
1441 SCHILLING PLACE SOUTH, SECOND FLOOR
SALINAS, CALIFORNIA 93901
TELEPHONE: (831) 755-4800 FACSIMILE: (831) 755-4958
E-MAIL: prattdw@co.monterey.ca.us

ARCHITECT

WESTON MILES ARCHITECTS
ATTN: LESLEY MILES
17500 DEPOT STREET, SUITE 200
MORGAN HILL, CALIFORNIA 95037
TELEPHONE: (408) 779-6686
E-mail: lesley@wmarchitects.com

INSTRUCTIONS TO BIDDERS

Division 002000

This "Instructions to Bidders" is intended to assist bidders in the preparation of their bids. If there is any inconsistency between the terms herein and any of the other Contract Documents, the terms in the other Contract Documents shall prevail.

1. Notice To Bidders/Invitation to Submit Bids

County of Monterey (County) invites bids to be submitted at such time and place stated in the Notice to Bidders. **The Notice to Bidders is advertised in a newspaper of general circulation and is posted as a separate document on Monterey County website, Resource Management Agency (RMA) project page.** This "Instructions to Bidders" is intended to assist bidders in the preparation of their bids. If there is any inconsistency between the terms herein and any of the other Contract Documents, the terms in the other Contract Documents shall prevail.

2. Examination of Site, Bidding and Contract Documents

Project specifications, drawings, and other Contract Documents may be examined at RMA – Public Works, Parks & Facilities, 1441 SCHILLING PLACE SOUTH, SECOND FLOOR, SALINAS, CALIFORNIA 93901, TELEPHONE NO. (831)755-4800. Also, Project documents may be viewed, downloaded, and printed **for free** directly from the Monterey County website RMA project page: <https://www.co.monterey.ca.us/government/departments-i-z/resource-management-agency-rma-public-works-facilities/projects-out-to-bid>. select *For Resource Management Agency (RMA) Public Works Bid Projects*, please visit the *eBidBoard Site*, then select the specified project. Interested parties must register to view/download documents. Alternately, interested parties may engage a printing service of their choosing to download and print documents from County project page. Project documents may also be available to view at builders' exchanges listed on the project page or members of Ebidboard can access materials directly from its website.

Each bidder shall become fully acquainted with the conditions relating to the construction and labor in order to understand fully the facilities, difficulties, and restrictions attending the execution of the work under the contract. Bidders shall thoroughly examine and become familiar with the plans, specifications, working details, and existing conditions. The failure or omission of any bidder to receive or examine any Contract Documents, form, instrument, addendum, or other document, or to visit the site and become acquainted with conditions there existing shall in no way relieve such bidder from obligations with respect to such bid or to the contract. Submission of a bid shall be taken as prima facie evidence of compliance with this section.

3. Mandatory Bidder's Meeting

If a mandatory bidders' meeting is required in the Notice to Bidders, then a qualified representative of the bidder's firm must attend at the stated time and place. Failure to attend will be cause for rejection of the bid. Any bid received from a bidder who did not fully attend the mandatory bidders' meeting at the stated time and place will be returned unopened. "Fully attend" means attending the entire meeting from start to finish; late arrivals and early departures may be cause for rejection of the bid.

4. Contractor's License

Each bidder must be licensed to perform the project in accordance with the provisions of Contractors' State Licensing Law, Chapter 9 (commencing with section 7000) of Division 3 of the Business and Professions Code, and in accordance with the Notice to Bidders. Contractor's license number and expiration date of the license shall appear on the bid. The classification of Contractor's License required for this project is "A" – General Engineering Contractor or "B" - General Building Contractor.

5. Contractor Registration with the Department of Industrial Relations

Attention is directed to Department of Industrial Relations (sometimes referred to as "DIR") Contractor registration for public works projects. Pursuant to Labor Code Section 1771.1(a), a contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4101 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Labor Code Section 1725.5. It is not a violation of Labor Code Section 1771.1(a) for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Labor Code Section 1725.5 at the time the contract is awarded.

This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. For Contractor Registration, go to: <http://www.dir.ca.gov/Public-Works/PublicWorks.html>.

6. Preparation of Bid Form

All bids must be submitted on the prescribed form. All blanks in the bid form must be appropriately filled in, and all prices must be stated in both words and figures, with the lump sum for which the bid is made. All bids must be submitted in sealed envelopes bearing on the outside the bidder's name and address, the name of the project, the bid date and time, and the bid package number for which the bid is submitted. It is the sole responsibility of the bidder to see that the bid is received at the proper place and in proper time. Any bid received after the scheduled closing time for receipt of bids will be returned to the bidder unopened. Bidder's failure to submit all required documents strictly as required entitles County to reject the Bid as nonresponsive. All Bidders must submit Bids containing each of the fully executed documents supplied in this Project Manual.

7. Erasures

The bid submitted must not contain any erasures, interlineations, or other corrections unless each such correction is suitably authenticated by affixing in the margin immediately opposite the correction the surname or surnames of the person or persons signing the bid, in the named person's own handwriting.

8. Modifications

Changes in or additions to the bid form, recapitulations of the work bid upon, alternative proposals, or any other modification of the bid form which is not specifically called for in the Contract Documents may result in County's rejection of the bid as not being responsive to the notice to bid. No oral or telephonic modification of any bid submitted will be considered.

9. Signature

The bid must be signed in the name of the bidder and must bear the signature in longhand of the person or persons duly authorized to sign the bid. An original signature is required.

10. Interpretation of Plans and Documents

If any person contemplating submitting a bid for the proposed contract is in doubt as to the true meaning of any part of the plans, specifications, or other Contract Documents, or finds discrepancies in or omissions from the plans and specifications, he/she may submit to County a written request for an interpretation or correction thereof. The person submitting the request shall be responsible for its prompt delivery. Any interpretation or correction of the Contract Documents will be made only by official project Q&A (questions/answers) or addendum duly issued, and a copy of such will be posted on the Monterey County website RMA project page:

<https://www.co.monterey.ca.us/government/departments-i-z/resource-management-agency-rma-/public->

[works-facilities/projects-out-to-bid](#), select *For Resource Management Agency (RMA) Public Works Bid Projects, please visit the eBidBoard Site*, then select the specified project]. No oral interpretation of any provision in the Contract Documents will be made.

11. Bidding Questions

All questions regarding the project during the bidding process must be made in writing to the attention of the designated project bidding coordinator via E-mail, United States Postal Service (U.S.P.S.) mail, or via facsimile (fax). Contact information is listed on the Monterey County website RMA project page: [<https://www.co.monterey.ca.us/government/departments-i-z/resource-management-agency-rma-public-works-facilities/projects-out-to-bid>, select *For Resource Management Agency (RMA) Public Works Bid Projects, please visit the eBidBoard Site*, then select the specified project]. No telephone or verbal questions will be accepted. ***QUESTIONS RECEIVED AFTER THE DEADLINE LISTED IN THE NOTICE TO BIDDERS WILL NOT BE ACCEPTED.*** Answers to all questions and any addendum regarding the project will be posted on the Project Page listed above.

Addenda may also be issued to modify the Bidding Documents as deemed advisable by County. Addenda shall be acknowledged by number in Division 003000 (Bid Form) and shall be part of the Contract Documents. A complete listing of Addenda may be secured from County.

12. Bid Security

Each bid shall be accompanied by bidder's security in the form of cash, a certified or cashier's check payable to County, or a satisfactory Bid Bond in the form included in this bid book (Division 004400) in favor of County executed by the bidder as principal and a satisfactory corporate surety authorized to do business in the State of California as an admitted surety insurer, in an amount not less than ten percent (10%) of the total bid amount. The security shall be given as a guarantee that, if the contract is awarded to the bidder, the bidder will execute the contract, provide any required insurance certificates, and provide any payment and performance bonds required by the contract within ten (10) days after the bidder receives the Notice of Intent to Award letter. After ten (10) days, if the executed agreement, proper bonds and insurance documents are not submitted by the lowest responsive bidder, County has the right to determine that bid non-responsive and contact the second lowest responsive bidder.

13. Listing Subcontractors

Each bidder shall submit with the sealed bid a list of the proposed Subcontractors for the Project as required by the Subletting and Subcontracting Fair Practices Act (Public Contract Code Section 4100, et seq.). Forms for this purpose are furnished with the Contract and bid documents. This includes all Subcontractors performing work in an amount in excess of one half of one percent of the prime Contractor's total bid. All information is required. Effective July 2014, AB44 specifically requires that the California Contractor license number of each Subcontractor be provided.

14. Prevailing Wage

The Director of the Department of Industrial Relations has determined the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this work is to be performed for each craft or type of worker needed to execute the Contract. Copies of the prevailing rate of per diem wages are on file and shall be made available to any interested party on request in the Resource Management Agency-Public Works, Parks & Facilities located at 1441 SCHILLING PLACE SOUTH, SECOND FLOOR, SALINAS CALIFORNIA 93901-2438. It shall be mandatory upon Contractor to whom the Contract is awarded, and upon any Subcontractor under Contractor, to pay not less than said specified rates to all workers employed by them in the execution of the Contract.

15. Workers' Compensation Certificate

In accordance with the provisions of Section 3700 of the Labor Code, Contractor shall secure the payment of workers' compensation to its employees. The following certificate, which such form is included as part of the Contract Documents, shall accompany each bid:

I am aware of the provisions of Section 3700 of the 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.

16. Good Faith Effort to Employ Residents of Monterey Bay Area:

In accordance with Section 5.08.120 of the Monterey County Code (MCC), all Contractors and Subcontractors providing work, laborers, or material suppliers on the Project shall make a good faith effort to employ qualified individuals who are, and have been for at least one (1) year out of the past three (3) years prior to the opening of bids, residents of the Monterey Bay Area in sufficient numbers so that no less than fifty percent (50%) of Contractor's total construction work force, on the Project, including any Subcontractor work force (with exception of specialty Subcontractor items identified in the bid items) measured in labor work hours is comprised of Monterey Bay Area residents. A certification form relating to compliance with Section 5.08.120 is furnished with the bid documents. Bidder must complete the certification form and submit the certification form with the sealed bid. The Monterey County Board of Supervisors may deem your bid nonresponsive for failure to abide by the good faith local hiring provisions of MCC Section 5.08.120.

If any Contractor submitting a bid for a Contract for Public Works of Improvement fails to abide by the good faith local employment provisions of this Section, Contractor may be declared by the Board to be a nonresponsive bidder for purposes of this Chapter. If a Contractor lists in his or her bid a Subcontractor who is currently disqualified under the terms of MCC Section 5.08.120, the Board may declare said Contractor to be a nonresponsive bidder for purposes of MCC Chapter 5.08. If the Board finds that a Contractor to whom a Contract for a Public Work of Improvement has been awarded has failed to comply with the good faith employment provisions of MCC Section 5.08.120 during the performance of the Contract, the Board may disqualify Contractor from bidding on any County Contract for a Public Work of Improvement for a period of one (1) year from the date of the Board's disqualification. A subsequent violation of MCC Section 5.08.120 by a Contractor may result in disqualification by the Board for a period of three (3) years from the date of the subsequent disqualification.

"Resident of Monterey Bay Area" means a person who resides within the boundaries of Monterey County, Santa Cruz County, or San Benito County.

A "good faith effort" means Contractor will take the following or similar actions to recruit and maintain Monterey Bay Area residents as part of the construction work force:

- Contact local recruitment sources, including local hiring halls, to identify qualified individuals who are Monterey Bay Area residents;
- Advertise for qualified Monterey Bay Area residents in trade papers, electronic/"on-line" sources, and newspapers of general circulation in the Monterey Bay Area, unless time limits imposed by County do not permit such advertising.
- If portions of the work are to be performed by Subcontractors, identify qualified Subcontractors whose work force includes Monterey Bay Area residents; and
- If current work force does not exceed the fifty percent (50%) local employment requirement,

develop a written plan to recruit Monterey Bay Area residents as part of the construction work force.

Contractor shall keep an accurate record on a standardized form showing the name, place of residence trade classifications, hours worked, proof of journeyman or apprenticeship status, per diem wages and benefits of each person employed by Contractor, Contractor's Subcontractors on the Project, including full-time, part-time, permanent, and temporary employees, and make sure records are available to County with submission of final certified payroll records prior to final payment.

Contractor shall keep, and provide to County, on standardized forms acceptable to County, an accurate record documenting compliance with this provision. Said records shall include a listing by name and business address of all local recruitment sources contacted by the Contractor, the date of the local recruitment contact and the identity and business address of the person contacted, the trade and classification and number of hire referrals requested, the number of local hires employed as a result of the Contract, and the residence address of the person(s) employed pursuant to the contact.

At the conclusion of the Project, and at other intervals as may be deemed appropriate by Construction Manager, Contractor shall provide a summary report of the percentage of actual labor work hours performed by Monterey Bay Area residents on the Project.

Contractors and Subcontractors are referred to the provisions of MCC Section 5.08.120 and the rules, regulations, and procedures adopted to implement MCC Section 5.08.120, which are online at <http://library.municode.com/index.aspx?clientId=16111> and incorporated by this reference.

17. Bidders Interested in More Than One Bid

No person, firm, or corporation shall be allowed to make, or file, or be interested in more than one (1) bid for the same work unless alternate bids are specifically called for. A person, firm, or corporation that has submitted a sub-proposal to a bidder, or that has quoted prices of materials to a bidder, is not thereby disqualified from submitting a sub-proposal or quoting prices to other bidders or making a prime proposal.

18. Withdrawal of Bids

Any bidder may withdraw their bid either personally, by submitting a written request or telefaxed request to the County, at any time prior to the scheduled closing time for receipt of bids.

19. Determination of Apparent Low Bidder

County will open each Bidder's Envelope at the time and place indicated in the Notice to Bid, initially evaluate them for responsiveness, and determine an Apparent Low Bidder as specified herein.

Apparent Low Bidder will be determined from the total amount of the Base Bid and all Bid alternates. All Bidders are required to submit Bids on all Bid items.

If Apparent Low Bidder is determined to be nonresponsive or non-responsible, then County may proceed to the next Apparent Low Bidder's Bid pursuant to any procedures determined in its reasonable discretion, and proceed for all purposes as if this Apparent Low Bidder were the original Apparent Low Bidder.

20. Evaluation of Bids

County may conduct reasonable investigations and reference checks of Bidders and other persons and

organizations as County deems necessary to assist in the evaluation of any Bid and to establish Bidder's responsibility, qualifications, financial ability and ability to perform the Work in accordance with the Contract Documents to County's satisfaction within the prescribed time. Submission of a Bid constitutes Bidder's consent to the foregoing.

County shall have the right to consider information provided by sources other than Bidder. County shall also have the right to communicate directly with Bidder's Surety regarding Bidder's bonds.

Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between written words and figures will be resolved in favor of the words.

Bids shall be deemed to include the written responses of the Bidder to any questions or requests for information of County made as part of Bid evaluation process after submission of Bid.

21. Evidence of Responsibility

Upon request of County, a bidder whose bid is under consideration for the award of the Contract shall submit promptly to County satisfactory evidence showing the bidder's financial resources, construction experience, and organization available for the performance of the Contract, and upon written request, shall furnish County a complete copy of its estimate and all appropriate backup information and supporting documents. County may utilize this information as a basis for determining that a Contractor is not responsible and, therefore, award the Contract to the next lowest responsible and responsive bidder.

22. Reservation of Rights

County reserves the right to reject any or all nonconforming, nonresponsive, unbalanced, or conditional Bids, and to reject the Bid of any Bidder as nonresponsive as a result of any error or omission in the Bid, or if County believes that it would not be in the best interest of Project to make an award to that Bidder, whether because the Bid is not responsive or the Bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by County. For purposes of this Section, an "unbalanced Bid" is one having nominal prices for some Bid items and enhanced prices for other Bid items.

23. Award of Contract

County reserves the right to reject any or all bids, or to waive any irregularities or informalities in any bids or in the bidding. The award of the Contract, if made by County, will be to the lowest responsible and responsive bidder. The lowest bidder for the Project will be determined from the total amount of the Base Bid and all Bid alternates.

24. Documents required upon receipt of Notice of Conditional Award letter

Within ten (10) days after the bidder receives the Notice of Conditional Award letter, the successful bidder shall, in conformity with the Contract Documents, submit the following documents, including the number of originals required in the Supplementary Conditions:

- Executed Agreement (Division 005000);
- A Performance Bond and a Payment Bond, each in an amount equal to one hundred percent of the Contract Sum, issued and executed by an admitted surety insurer, authorized to transact surety insurance in California (Division 006000 and 006100);
- Insurance certificates showing that the successful bidder has obtained all required insurance coverage including endorsements;

- Printout showing active registration of Contractor and all Subcontractors with the Public Works Contractor Registration (online registration <https://efiling.dir.ca.gov/PWCR/Search>);
- Such other documents as may be required by the Contract Documents.

25. Bid Security Return

The bid security shall be returned to the bidders promptly after a decision is made whether to accept a bid or reject all bids, except that if a Contract award is to be made, the bid security of three or more of the lowest bidders (the number being at the discretion of County) will be held for sixty (60) days after notice of award is received by the successful bidder or until the successful bidder returns the executed Agreement and posts the required bonds and certificates of insurance, whichever occurs first. If the successful bidder returns the required documents on time, all the remaining bid security will be returned.

26. Bid Protests

Who can file a protest?

Only Bidders who the County otherwise determines are responsive and responsible are eligible to protest a Bid; protests from any other Bidder will not be considered. In order to determine whether a protesting Bidder is responsive and responsible, County may evaluate all information contained in any protesting Bidder's Bid, and conduct the same investigation and evaluation as County is entitled to take regarding an Apparent Low Bidder.

Requirements for Filing a Protest

Bidders who wish to lodge a protest as to the award of the bid must do so before 5 p.m. of the fifth business day following the issuance of the Notice of Intent to Award letter. Failure to timely file a written protest shall constitute a waiver of right to protest. Untimely protests will not be accepted or considered. Bid protests must be submitted, in writing, to: MONTEREY COUNTY RMA TO THE ATTENTION OF DAVE PRATT, PROJECT MANAGER, 1441 SCHILLING PLACE SOUTH, SECOND FLOOR, SALINAS, CALIFORNIA 93901. Protests may be hand-delivered or sent via facsimile [(831)755-4958], certified United States Postal Service (U.S.P.S.) mail, or E-mailed to the attention of Project Manager at prattdw@co.monterey.ca.us. Bid protests must include the Project name and Bid number; a complete statement describing the basis for the bid protest, including a detailed statement of all legal and factual grounds for the protest; any documentation supporting the protestor's grounds for the protest; and the form of relief requested and legal basis for such relief. The party lodging the protest must also include their contact information including mailing address, telephone number, and E-mail address.

If a valid protest is timely filed, RMA shall investigate the bid protest. The protested party shall have three (3) business days to respond to any requests to provide additional information from RMA.

The procedure and time limits set forth in this Section are mandatory and are Bidder's sole and exclusive remedy in the event of Bid protest. Bidder's failure to comply with these procedures shall constitute a waiver of any right to further pursue the Bid protest, including filing a Government Code Claim or legal proceedings. A Bidder may not rely on a protest submitted by another Bidder, but must timely pursue its own protest.

County Response to Protests Received

RMA shall respond to the protesting party, in writing, stating its findings. The RMA Deputy Director of Public Works, Parks & Facilities shall submit a summary of bid protests received and make a recommendation to the Board of Supervisors regarding the bid protest(s).

27. Award and Execution of Contract

Notice of Award and Submittal of Executed Contract Documents

If Contract is to be awarded, it will be awarded to the lowest responsible responsive Bidder. County will issue Notice of Conditional Award. Such Award, if made, will be made within sixty (60) days after the opening of the Bid Proposals.

Failure to Execute and Deliver Documents:

If Bidder to whom Contract is awarded, within the period described in this Division 002000, fails or neglects to execute and deliver all required Contract Documents and file all required bonds, insurance certificates, and other documents, County may, in its sole discretion, rescind the award, recover on Bidder's Surety Bond, or deposit Bidder's cashier's check or certified check for collection, and retain the proceeds thereof as liquidated damages for Bidder's failure to enter into the Contract Documents. Bidder agrees that calculating the damages County may suffer as a result of Bidder's failure to execute and deliver all required Contract Documents would be extremely difficult and impractical and that the amount of Bidder's required Bid security shall be the agreed and presumed amount of County's damages.

Upon such failure to timely deliver all required Contract Documents as set forth herein, County may determine the next Apparent Low Bidder and proceed accordingly. Such Award, if made, will be made within ninety (90) days after the opening of the Bid Proposals.

28. General Conditions and Requirements

Modification of Commencement of Work

County expressly reserves the right to modify the date for the Commencement of Work under the Contract and to independently perform and complete work related to Project. County accepts no responsibility to Contractor for any delays attributed to its need to complete independent work at the Site.

County shall have the right to communicate directly with Apparent Low Bidder's proposed Performance Bond Surety, to confirm the Performance Bond.

Conformed Project Manual

Following Award of Contract, County may prepare a conformed Project Manual reflecting Addenda issued during bidding, which will, failing objection, constitute the approved Project Manual.

BID FORM
Division 003000

MONTEREY COUNTY BOARD OF SUPERVISORS

MAILING ADDRESS	P O BOX 1728, SALINAS, CALIFORNIA 93902
PHYSICAL ADDRESS	168 W ALISAL STREET, FIRST FLOOR, SALINAS, CALIFORNIA 93901

855 EAST LAUREL DRIVE-EMERGENCY SHELTER

PROJECT NO. 8875 BID NO. 10736

NAME OF BIDDER: _____

BUSINESS ADDRESS: _____

TELEPHONE NUMBER: _____

PLACE OF RESIDENCE: _____

BID FORM

855 EAST LAUREL DRIVE-EMERGENCY SHELTER

PROJECT NO. 8875 BID NO. 10736

TO: MONTEREY COUNTY BOARD OF SUPERVISORS

1. Pursuant to and in compliance with your Notice to Bidders inviting formal bids and with the other documents relating thereto, the undersigned bidder, having become familiar with the terms of the Contract, the local conditions affecting the performance of the Contract, the cost of the work at the place where the work is to be done, the Project Plans and Specifications, and the other Contract Documents, hereby proposes and agrees to perform within the time stipulated and to provide and furnish any and all labor, materials, equipment, transportation, utilities, and services necessary to perform the Contract and complete in a workmanlike manner all of the work required in connection with the above Project, all in strict conformity with the Drawings and Specifications and other Contract Documents, including Addenda nos. ____, ____, ____, ____, and ____, for the sum hereinafter stated (in the event of a discrepancy between the words and figures, the amount in words will govern):
2. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with the County of Monterey ("County") in the form included in the Contract Documents, Division 005000 (Agreement), to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Sum and within the Contract Time indicated in this Bid and in accordance with all other terms and conditions of the Contract Documents.
3. Bidder accepts all of the terms and conditions of the Contract Documents, Appendices, and Instructions to Bidders, including, without limitation, those dealing with the disposition of Bid Security. This Bid will remain subject to acceptance for sixty (60) **Days after the day of Bid opening.**
4. Bidder has visited the Site and performed all tasks, research, investigation, reviews, examinations, and analysis and given notices, regarding the Project and the Site.
5. Bidder has given the County prompt written notice of all conflicts, errors, ambiguities, or discrepancies that it has discovered in or among the Contract Documents, Appendices, and as-built Drawings and actual conditions and the written resolution thereof through Addenda issued by the County is acceptable to Contractor.
6. Based on the foregoing, Bidder proposes and agrees to fully perform the Work within the time stated and in strict accordance with the Contract Documents for the following sums of money listed in the following Schedule of Bid Prices:

BASE BID: ALL WORK AS NOTED IN DRAWINGS AND SPECIFICATIONS INCLUDING SITE WORK, DEMOLITION AS REQUIRED, CONSTRUCTION OF ONE COMPLETE HOMELESS SHELTER BUILDING, AND ASSOCIATED FURNISHINGS, EXCEPT KITCHEN EQUIPMENT NAMED IN SPECIFICATION SECTION 101010, SUB-SECTION 4.0 EQUIPMENT SCHEDULE.

_____ Dollars

\$ _____

ALTERNATE BID #1: STATE THE AMOUNT TO BE ADDED TO THE BASE BID TO FURNISH AND INSTALL KITCHEN EQUIPMENT NAMED IN SPECIFICATION SECTION 101010, SUB-SECTION 4.0 EQUIPMENT SCHEDULE

ADD TO THE BASE BID ~~OR DEDUCT FROM BASE BID~~

_____ Dollars

\$ _____

TABLE OF UNIT COSTS

<i>Item</i>	<i>Description</i>	<i>Unit</i>	<i>Cost/unit</i>
1	Excavate soils	Cubic yards	
2	Off-haul soils	Cubic yards	

7. Determination of lowest responsible bidder – In accordance with Public Contract Code Section 20103.8(a). determination of lowest bidder will be based upon the total amount of the Base Bid and all Bid alternates.. The Contract will then be awarded to the Bidder submitting the lowest amount, if it is awarded. Unit pricing provided by the bidder, if any, shall be incorporated in the Agreement, and shall be the basis for calculating any costs involving changes to the work.

8. The undersigned has checked all above figures carefully and understands that County will not be responsible for any errors and omissions on the part of the undersigned in making this bid.

9. It is understood that County reserves the right to reject any and all bids or waive any informalities or irregularities in any bids or in the bidding.

10. This bid shall remain valid and will not be withdrawn by the undersigned bidder for a period of sixty (60) days from the date prescribed for opening of this bid without the written consent of County.

11. Attached hereto are the following:

- a) List of Subcontractors;
- b) Non-Collusion Declaration;
- c) Workers' Compensation Certificate;
- d) Iran Contracting Act Certification
- e) Contractor's Certification of Good-Faith Effort to Employ Monterey Bay Area Residents;
- f) Written Plan to Recruit Monterey Bay Area Residents, when applicable;
- g) Required bidder's security in an amount not less than ten percent (10%) of the base bid amount;
and
- h) Bidder Certifications
- i) Acknowledgment of Addenda, if any.

12. If this bid is accepted by County, then the undersigned shall, within ten (10) days after receipt of the Notice of Conditional Award letter, execute and deliver to County (a) a Contract in the form set forth in the Contract Documents on which this bid is based, (b) a Payment Bond for Public Works, as required by the Contract Documents, (c) a Performance Bond, as similarly required, (d) an Insurance Certificate, as similarly required and (e) printout showing active registration of Contractor and all Subcontractors with the Public Works Contractor Registration (online registration <https://efiling.dir.ca.gov/PWCR/Search>). The undersigned will thereafter commence and complete the Work within the time required by the Contract Documents.

13. The undersigned Bidder agrees to commence Work under the Contract Documents on the date established in Division 007100 (General Conditions) and to complete all Work within the time specified in Division 005000 (Agreement). The undersigned Bidder acknowledges that the County has reserved the right to delay or modify the commencement date. The undersigned Bidder further acknowledges County has reserved the right to perform independent Work at the Site, the extent of such Work may not be determined until after the opening of the Bids, and that the undersigned Bidder will be required to cooperate with such other Work in accordance with the requirements of the Contract Documents.

14. The undersigned Bidder agrees that, in accordance with Division 007100 (General Conditions), liquidated damages for failure to complete all Work in the Contract within the time specified in Division 005000 (Agreement) shall be as set forth in Division 005000 (Agreement) and Division 002000 (Instructions to Bidders).

15. Notice of acceptance and any requests for additional information shall be addressed to the undersigned at the following address:

COUNTY OF MONTEREY OR VIA FACSIMILE: (831)755-4958
RMA- PUBLIC WORKS, PARKS & FACILITIES
DAVE PRATT, PROJECT MANAGER
1441 SCHILLING PLACE SOUTH, SECOND FLOOR
SALINAS, CALIFORNIA 93901

16. The names of all persons interested in the foregoing proposal as principals are as follows:

_____	_____
Name	Title
_____	_____
Name	Title
_____	_____
Name	Title

(IMPORTANT NOTICE: If the bidder or other interested person is a corporation, state the legal name of the corporation, and the names of the president, vice president, secretary, assistant secretary, treasurer, assistant treasurer, and chief financial officer thereof; if a limited liability corporation (LLC), state the legal name of the LLC and the names of two (2) managers thereof; if a partnership, state the name of the firm and the names of all the individual partners composing the firm; if the bidder or other interested person is an individual, state the first and last names in full and give all fictitious names under which the individual does business.)

17. By execution of this bid, the undersigned bidder declares that he or she is a contractor licensed in accordance with the Contractors' State License Law, as follows:

Classification: _____
License number: _____
Expiration date: _____

18. In the event the bidder to whom Notice of Intent to Award letter is given fails or refuses to post the required bonds and insurance and return the executed copies of the agreement form within ten (10) days from the date of receiving the Notice of Intent to Award letter, County may declare the bidder's security forfeited as damages and contract with the second lowest bidder.

19. Pursuant to section 7103.5(b) of the Public Contract Code, in submitting a bid to County, the bidder offers and agrees that if the bid is accepted, it will assign to County 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. Section 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, materials, or services by the bidder for sale to the purchasing body pursuant to the bid. Such assignment shall be made and become effective at the time the purchasing body tenders final payment to the bidder.

Dated _____
Bidder's Business Name _____
By _____
Principal Signature _____
Principal Name (Print) _____
Principal Title (Print) _____
By _____
Principal Signature _____
Principal Name (Print) _____
Principal Title (Print) _____
(Corporate Seal) _____

NOTE: If bidder is a corporation, the full legal name of the corporation shall be set forth above together with the signatures of two (2) authorized officers per California Corporations Code Section 313 and the document shall bear the corporate seal; if bidder is a Limited Liability Company (LLC), the full legal name of the LLC shall be set forth above together with the signatures of two (2) managers; if bidder is a partnership, the full name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership; and if bidder is an individual, his/her signature shall be placed above.

LIST OF SUBCONTRACTORS

Division 003500

In compliance with the Subletting and Subcontracting Fair Practices Act (Chapter 4 [commencing with section 4100], Part 1, Division 2 of the Public Contract Code) and any amendments thereto, each bidder shall set forth below: (a) the name and the location of the place of business of each subcontractor who will perform work or labor or render service to the prime contractor in or about the construction of the work or improvement to be performed under this contract or a subcontractor licensed by the State of California who, under subcontract to the prime contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications in an amount in excess of one-half of one percent of the prime contractor's total bid, and (b) the portion of the work which will be done by each subcontractor under this Act. The prime contractor shall list only one subcontractor for each such portion as is defined by the prime contractor in this bid. The term "portion of work" refers to the type of work. The prime contractor has up to 24 hours from the time of the bid opening to submit a revised listing to correct any inadvertent error in the required subcontractor license information.

If a prime contractor fails to specify a subcontractor or if a prime contractor specifies more than one subcontractor for the same portion of the work to be performed under the contract in excess of one-half of one percent of the prime contractor's total bid, he/she/it shall be deemed to have agreed that he/she/it is fully qualified to perform that portion himself/herself/itself, and that he/she/it shall perform that portion himself/herself/itself.

No prime contractor whose bid is accepted shall: (a) substitute any subcontractor, (b) permit any subcontract to be voluntarily assigned or transferred or allow it to be performed by anyone other than the original subcontractor listed in the original bid, or (c) sublet or subcontract any portion of the work in excess of one-half of one percent of the prime contractor's total bid as to which his/her/its original bid did not designate a subcontractor, except as authorized in the Subletting and Subcontracting Fair Practices Act. Subletting or subcontracting of any portion of the work in excess of one-half of one percent of the prime contractor's total bid as to which no subcontractor was designated in the original bid shall only be permitted in cases of public emergency or necessity, and then only after a finding reduced to writing as a public record of the authority awarding this contract setting forth the facts constituting the emergency or necessity.

Bidder's Business Name: _____

By: _____

Print Name: _____

Print Title: _____

Date: _____

NONCOLLUSION DECLARATION
TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

(Public Contract Code Section 7106)

Division 004000

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 to 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 or its bid price or 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: _____

Print Name: _____

CONTRACTOR'S CERTIFICATE AS TO WORKERS' COMPENSATION

(Labor Code Section 1861)

Division 004100

Labor Code Section 3700 provides, in relevant part:

"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 in 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 employees."

I certify that I am aware of the provisions of Section 3700 of the 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.

Dated: _____

Bidder's Business Name: _____

By: _____

Print Name: _____

Print Title: _____

IRAN CONTRACTING ACT CERTIFICATION

(Public Contract Code Section 2204)

DIVISION 004200

Pursuant to Public Contract Code (PCC) Section 2204, an Iran Contracting Act certification is required for solicitations of goods or services of \$1,000,000 or more.

You must complete one of the following two paragraphs with your bid submittal. To complete paragraph 1, check the corresponding box and complete the certification for paragraph 1. To complete paragraph 2, check the corresponding box and attach a copy of the written permission from the County with your bid.

1. We are not on the current list of persons engaged in investment activities in Iran created by the California Department of General Services (“DGS”) pursuant to PCC 2203(b), and we are 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.

CERTIFICATION FOR PARAGRAPH 1:

I, the official named below, certify under penalty of perjury, that I am duly authorized to legally bind the proposer/bidder to the clause in paragraph 1. This certification is made under the laws of the State of California.

<i>Company Name (Printed)</i>	<i>Federal ID Number</i>
<i>By (Authorized Signature)</i>	
<i>Printed Name and Title of Person Signing</i>	
<i>Date Executed</i>	<i>Executed in the County of _____ in the State</i> <i>of _____</i>

OR

2. We have received written permission from the County to submit a bid or proposal pursuant to PCC 2203(c) or (d). A copy of the written permission from the County is attached hereto.

CONTRACTOR'S CERTIFICATION OF GOOD-FAITH EFFORT TO EMPLOY
MONTEREY BAY AREA RESIDENTS
(Monterey County Code Section 5.08.120)
Division 004300

I CERTIFY THAT I am aware of the provision of Monterey County Code Section 5.08.120.

Monterey County Code Section 5.08.120 provides, in relevant part:

A. General Provisions. All County contracts for public works of improvement shall contain provisions pursuant to which the contractor shall make a good-faith effort to employ qualified individuals who are, and have been for at least one (1) year out of the past three (3) years prior to the opening of bids, residents of the Monterey Bay Area in sufficient numbers so that no less than fifty percent (50%) of the contractors total construction work force, on that particular contract, including any subcontractor work force (with exception of specialty subcontractor items identified in bid items) measured in labor work hours, is comprised of Monterey Bay Area residents.

B. Non-responsive Bidder Declaration: Enforcement. If any contractor submitting a bid for a contract for public works of improvement fails to abide by the good-faith local employment provisions of this Section, Contractor may be declared by the Board to be a non-responsive bidder for purposes of this Chapter. If a contractor lists in his or her bid a subcontractor who is currently disqualified under the terms of this Section, the Board may declare said contractor to be a non-responsive bidder for purposes of this Chapter. If the Board finds that a contractor to whom a contract for public works of improvement has been awarded has failed to comply with the good-faith employment provisions of this Section during the performance of the contract, the Board may disqualify Contractor from bidding on any County contract for public works of improvement for a period of one (1) year from the date of the Board's disqualification. A subsequent violation of this Section by a contractor may result in disqualification by the Board for a period of three (3) years from the date of the subsequent disqualification.

C. Binding on Subcontractors. Every contractor entering into a contract for public works of improvement subject to the provisions of this Section shall include in each and every subcontract for work, laborers, or material supplier relating to the project the requirement that the subcontractor shall make a good-faith effort to employ qualified individuals who are, and have been for at least one (1) year out of the past three (3) years prior to the opening of bids, residents of the Monterey Bay Area. If the Board finds that any subcontractor has failed during the performance of the subcontract to comply with this Section, the Board may disqualify said subcontractor from submitting or being listed in any bid for any County contract for public works of improvement for a period of one (1) year from the date of the Board's disqualification. A subsequent violation by a subcontractor may result in disqualification by the Board for a period of three (3) years from the date of the subsequent disqualification.”

I FURTHER CERTIFY AS FOLLOWS (check the box that applies):

I CERTIFY that at least fifty percent (50%) of the total construction work force on the project, including any subcontractor work force, measured in labor work hours, will be comprised of qualified individuals who to the best of my knowledge are, and have been for at least one (1) year out of the past three (3) years prior to the effective date of the opening of bids, residents of the Monterey Bay Area. Evidence that I will comply with this requirement is as follows (please use additional pages to provide supporting evidence and/or documentation, as necessary):

I CERTIFY that I shall make a good-faith effort to employ qualified individuals who, to the best of my knowledge, are, and have been for at least one (1) year out of the past three (3) years prior to the effective date of the opening of bids, residents of the Monterey Bay Area in sufficient numbers such that no less than fifty percent (50%) of the total construction work force on the project, including any subcontractor work force (with the exception of specialty subcontractor items identified in the bid items) measured in labor work hours, will be comprised of Monterey Bay Area residents. **Attached is my written plan to recruit Monterey Bay Area residents as part of the construction work force.**

I CERTIFY that I do not comply with and am unable to make a good-faith effort to comply with the good-faith local employment provisions set forth in Monterey County Code Section 5.08.120. Explanation to why I am not able to comply is as follows (please use additional pages to provide supporting evidence and/or documentation, as necessary):

I declare under penalty of perjury under the laws of the State of California that the foregoing certification is true and correct. Executed on (date) _____
at (city/state) _____.

Bidder's Business Name: _____

By: _____

Print Name: _____

Print Title: _____

BID BOND
Division 004400

(Public Contract Code Section 20129)

WHEREAS the Principal has submitted the accompanying bid dated _____, to the County of Monterey, for the following project: **855 EAST LAUREL DRIVE-EMERGENCY SHELTER, PROJECT NO. 8875, BID NO. 10736**, and

WHEREAS, Principal, as bidder, is required to furnish a bond executed by an admitted surety in connection with said bid, to secure the timely execution of the contract and delivery of bonds and insurance certificates, in the event that the contract is awarded to the Principal.

NOW, THEREFORE, we _____ as
Principal, and _____

_____ as

Surety, are held and firmly bound unto the County of Monterey, a political subdivision of the State of California (hereinafter called "County"), in the penal sum of

_____ Dollars

(\$_____), which sum is not less than ten percent (10%) of the base bid amount including all alternates of the Principal submitted to the said County for the above-described project, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

If the Principal is awarded the contract and, within the time and manner required under the contract documents for the above-described project, after the prescribed forms are presented to him/her for signature, (1) enters into a written contract in the prescribed form, in accordance with the bid, (2) files such insurance certificates with the County as may be required by said contract documents, and (3) files a performance bond and a payment bond with the County, in conformity with said contract documents, then this obligation shall be null and void; otherwise, it shall remain in full force.

Surety hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract on the call for bids, or to the work to be performed there under, or the specifications accompanying the same, shall in any way affect its obligation under this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of said contract or the call for bids, or to the work, or to the specifications.

If County brings suit upon this bond and judgment is recovered, the Surety shall pay all litigation expenses incurred by County in such suit, including attorneys' fees, court costs, expert witness fees and investigation expenses.

IN WITNESS WHEREOF, the above-bounden 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.

(Corporate Seal)

Principal
By: _____
Title: _____

(Corporate Seal)

Surety
By: _____
Title: _____

Attach: 1) A Copy of authorization for signature for Principal, and 2) An original or certified copy of unrevoked appointment, Power of Attorney, Attorney-in-Fact Certificate bylaws or other instrument entitling or authorizing person executing bond on behalf of Surety to do so.

BIDDER CERTIFICATIONS

Division 004516

TO BE EXECUTED BY BIDDERS AND SUBMITTED WITH PROPOSAL

The undersigned Bidder certifies to Owner as set forth in Sections 1 through 6 below.

Certification Of Worker's Compensation Insurance

By my signature hereunder, as the Bidder, I certify that I am aware of the provisions of Section 3700 of the 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.

Certifications Of Prevailing Wage Rates, Records, And Apprentices

By my signature hereunder, as the Bidder, I certify that I am aware of the provisions of Section 1773 of the California Labor Code, which requires the payment of prevailing wage on public Projects. Also, that Bidder and any Subcontractors shall comply with California Labor Code Section 1776, regarding wage records, and with California Labor Code Section 1777.5, regarding the employment and training of apprentices. It is Bidder's responsibility to ensure compliance by any and all Subcontractors performing Work under this Contract. I further certify that I am aware that this Project is subject to the requirements of Division 2, Part 7, Chapter 1 of the Labor Code (Public Works), and the requirements of Title 8, Division 1, Chapter 8, Subchapter 4.5 of California Code of Regulations (Compliance Monitoring and Enforcement by Department of Industrial Relations), including the obligation to furnish certified payroll records directly to the Labor Commissioner in accordance with 8 CCR 16461.

Certification Of Compliance With Public Works Chapter Of Labor Code

By my signature hereunder, as the Bidder, I certify that I am aware of Sections 1777.1 and 1777.7 of the California Labor Code and Bidder and Subcontractors are eligible to bid and work on Public Works Projects.

Certification Of Adequacy Of Contract Amount

By my signature hereunder, as the Bidder, pursuant to Labor Code Section 2810(a), I certify that, if awarded the Contract based on the undersigned's Bid, the Contract will include funds sufficient to allow the Bidder to comply with all applicable local, state, and federal laws or regulations governing the labor or services to be provided. I understand that Owner will be relying on this certification if it awards the Contract to the undersigned.

Certification of Acceptability of Contract Documents

By my signature hereunder, as the Bidder, I certify that Bidder acknowledges that Owner has already transmitted the Contract Documents in draft form to state officials and has obtained prior state approval of the acceptability of the Contract Documents. Accordingly, Bidder has carefully reviewed the Contract Documents and certifies as follows:

If the undersigned is selected to be awarded the Contract, following issuance of Notice of Conditional Award to the undersigned, the undersigned will sign the Agreement form and provide the other required forms that have been included within the Contract Documents in the same form as drafted as of the date hereof, including all Addenda identified in the undersigned's Bid and with applicable information from the undersigned's Bid inserted, without seeking revisions to the Agreement form or any other Contract Document.

Certification Of Acceptable Safety Record

[Please check and/or complete one of the following]

_____ By my signature hereunder, as the Bidder, I certify that the Bidder's experience modification rate for the most recent three-year period is an average of 1.00 or less, and its average Total Recordable Injury/Illness rate and average lost work rate for the most recent three-year period does not exceed the applicable statistical standards for its business category or the Bidder is a party to an alternative dispute resolution system as provided for in Section 3201.5 of the Labor Code.

_____ By my signature hereunder, as the Bidder, except as provided in Appendix __, consisting of _____ pages, attached hereto, I certify that the Bidder's experience modification rate for the most recent three year period is an average of 1.00 or less, and its average Total Recordable Injury/Illness rate and average lost work rate for the most recent three year period does not exceed the applicable statistical standards for its business category or the Bidder is a party to an alternative dispute resolution system as provided for in Section 3201.5 of the Labor Code . Bidder must attach an Appendix, identifying and explaining all exceptions to this certification, if this item is checked.

BIDDER:

(Name of Bidder)

Date: _____

By: _____
(Signature)

Name: _____
(Print Name)

Its: _____
(Title)

END OF DIVISION

AGREEMENT
Division 005000

THIS AGREEMENT, hereinafter called "Agreement" (sometimes referred to as "CONTRACT" or "contract"), is made by and between the COUNTY OF MONTEREY, a political subdivision of the State of California, hereinafter called "COUNTY," and _____ (Name of Contractor), hereinafter called "CONTRACTOR." For reference purposes, the date of this Agreement is the date it is executed by the Resource Management Agency Director.

THE COUNTY AND CONTRACTOR hereby agree as follows:

ARTICLE 1 SCOPE OF WORK

CONTRACTOR shall, within the time stipulated, perform the contract as herein defined and shall furnish all work, labor, equipment, transportation, material, and services to construct and complete in a good, expeditious, workmanlike, and substantial manner, the Project:
855 EAST LAUREL DRIVE-EMERGENCY SHELTER, PROJECT NO. 8875, BID NO. 10736.

All work shall be completed in strict conformance with the plans, specifications, and working details prepared by WESTON MILES ARCHITECTS, and the provisions of the documents listed in Article 6 below, and to the satisfaction of COUNTY.

ARTICLE 2 TIME FOR START AND FINAL COMPLETION

CONTRACTOR shall commence the work on the starting date established in the Notice to Proceed. The CONTRACTOR shall achieve Final Completion of the entire Work no later than Three Hundred Thirty (330) days from the date of commencement. Additionally, CONTRACTOR shall coordinate their work with all other contractors whose work is affected by the scope of work defined in this Agreement. CONTRACTOR expressly agrees to provide appropriate labor, hours, rates, materials, and equipment in response to adjustments in the Project Schedule made by the Monterey County RMA Deputy Director of Public Works, Parks & Facilities or his/her designee during the course of the project in order to maintain the required progress.

ARTICLE 3 CONTRACT PRICE

County shall pay CONTRACTOR as full consideration for the performance of the contract, subject to any additions or deductions as provided in the contract documents referenced in ARTICLE 6 COMPONENT PARTS OF THIS CONTRACT below, the Stipulated Sum of (written amount):

_____.

numerical \$ amount): \$ _____.

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

(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the County to accept other alternates subsequent to the execution of this Agreement, attach a

schedule of such other alternates showing the amount for each and the date when that amount expires)

Unit prices, if any:

(Identify and state the unit price, and state the quantity limitations, if any, to which the unit price will be applicable)

Item	Units and Limitations	Price per Unit (\$0.00)
-------------	------------------------------	--------------------------------

Allowances included in the Stipulated Sum, if any:

(Identify allowances and state exclusions, if any, from the allowance price)

Item	Allowance
-------------	------------------

Allowance Work will be authorized by COUNTY in writing, following Change Order procedures to determine cost, supporting documentation and authorization to proceed. Unused allowance amounts at Contract completion shall reduce the Contract Sum accordingly.

ARTICLE 4 LIQUIDATED DAMAGES

THE PARTIES AGREE THAT IN CASE ALL THE WORK CALLED FOR UNDER THE CONTRACT IN ALL PARTS AND REQUIREMENTS IS NOT COMPLETED WITHIN THE TIME SPECIFIED IN THE CONTRACT DOCUMENTS, DAMAGE WILL BE SUSTAINED BY COUNTY, AND THAT IT IS AND WILL BE IMPRACTICABLE AND EXTREMELY DIFFICULT TO DETERMINE THE ACTUAL DAMAGE WHICH COUNTY WILL THEREBY SUSTAIN. THE PARTIES THEREFORE AGREE THAT CONTRACTOR WILL PAY TO COUNTY THE SUM SET FORTH IN THE SUPPLEMENTARY CONDITIONS, IF ANY, FOR EACH CALENDAR DAY OF DELAY UNTIL THE WORK IS COMPLETED AND ACCEPTED. CONTRACTOR AND HIS/HER/ITS SURETY SHALL BE LIABLE FOR THE TOTAL AMOUNT THEREOF. CONTRACTOR AGREES TO PAY SAID LIQUIDATED DAMAGES ESTABLISHED HEREIN, AND FURTHER AGREES THAT COUNTY MAY DEDUCT THE AMOUNT THEREOF FROM ANY MONIES DUE OR THAT MAY BECOME DUE CONTRACTOR UNDER THE CONTRACT.

ARTICLE 5 NOTIFICATION OF THIRD-PARTY CLAIMS

COUNTY shall notify CONTRACTOR of the receipt of any third-party claim relating to the contract and is entitled to recover its reasonable costs incurred in providing the notification as provided in Public Contract Code Section 9201.

ARTICLE 6 COMPONENT PARTS OF THIS CONTRACT

The contract entered into by this Agreement consists of the following documents, all of which are component parts of the contract as if herein set out in full or attached hereto:

- Notice to Bidders
- Instructions to Bidders
- Bid, as accepted
- List of Subcontractors
- Noncollusion Declaration
- Workers' Compensation Certificate
- Contractor's Certification of Good Faith Effort to Employ Monterey Bay Area Residents
- Written Plan to Recruit Monterey Bay Area Residents, when applicable
- Bid Bond or Bidder's Security
- Agreement
- Performance Bond
- Payment Bond
- Insurance Certificate
- Iran Contracting Act Certification
- Bidder Certifications
- Guaranty
- Division 007100 General Conditions, Bid No. 10736
- Division 007300 Supplementary Conditions, Bid No. 10736
- Specifications and Drawings as Prepared by WESTON MILES ARCHITECTS
(refer to an exhibit attached to this Agreement that lists Section, Title, Date and Pages for Specifications; Number, Title and Date for Drawings.)
- Appendices: None
As issued, Project Addenda Nos:

All of the contract documents referenced above are intended to be complementary. Work required by one of the contract documents referenced above and not by others shall be done as if required by all.

IN WITNESS WHEREOF, the parties have duly executed four (4) identical counterparts of this instrument, each of which shall be for all purposes deemed an original thereof, on the dates set forth below.

ARTICLE 7 - NOTICES

All notices to CONTRACTOR and COUNTY (including requests, demands, approvals or other communications other than ordinary course Project communications) in connection with the Project shall be in writing and shall include the word "NOTICE" in the subject line and shall be directed as follows.

County of Monterey
RMA- Public Works, Parks and Facilities
Attn: Dave Pratt, Project Manager
1441 Schilling Place, Second Floor
Salinas, California 93901

with a copy to:

Contractor

[Insert Contact Information]

- A. Notice shall be sufficiently given for all purposes as follows:
1. When personally delivered to the recipient, notice is effective on delivery.
 2. When mailed by certified mail with return receipt requested, notice is effective on receipt if delivery is confirmed by a return receipt.
 3. When delivered by reputable delivery service, with charges prepaid or charged to the sender's account, notice is effective on delivery if delivery is confirmed by the delivery service.
 4. Notice by facsimile or electronic mail shall not be allowed or constitute "Notice" under this Section.
- B. Any correctly addressed notice that is refused, unclaimed, or undeliverable because of an act or omission of the party to be notified shall be considered to be effective as of the first date that the notice was refused, unclaimed, or considered undeliverable by the postal authorities, messenger, or overnight delivery service.
- C. Either party may, by written notice given at any time or from time to time require subsequent notices to be given to another individual person, whether a party or an officer or a representative, or to a different address, by giving the other party notice of the change in any manner permitted by this Article.
- D. The provisions of this Article shall not alter, modify or excuse any legal or contractual requirement relating to Claims under Division 007100 (General Conditions).

ARTICLE 8 – OTHER PROVISIONS

- A. In order to induce COUNTY to enter into this Agreement, CONTRACTOR represents that it is duly organized, existing and in good standing under applicable state law; is licensed to perform all aspects of the Work; will employ only persons and Subcontractors and designers with all required licenses and certifications; that CONTRACTOR is duly qualified to conduct business in the State of California; that CONTRACTOR has duly authorized the execution, delivery and performance of this Agreement, the other Contract Documents and the Work to be performed herein; and that the Contract Documents do not violate or create a default under any instrument, Agreement, order or decree binding on CONTRACTOR.
- B. CONTRACTOR shall not assign any portion of the Contract Documents.
- C. Should any part, term or provision of this Agreement or any of the Contract Documents, or any document required herein or therein to be executed or delivered, be declared invalid, void or unenforceable, all remaining parts, terms and provisions shall remain in full force and effect and shall in no way be invalidated, impaired or affected thereby. If the provisions of any law causing such invalidity, illegality or unenforceability may be waived, they are hereby waived to the end that this Agreement and the Contract Documents may be deemed valid and binding Agreements, enforceable in accordance with their terms to the greatest extent permitted by applicable law. In the event any provision not otherwise included in the Contract Documents is required to be included by any

applicable law, that provision is deemed included herein by this reference (or, if such provision is required to be included in any particular portion of the Contract Documents, that provision is deemed included in that portion).

D. It is understood and agreed that in no instance are the persons signing this Agreement for or on behalf of COUNTY or acting as an employee, agent, or representative of COUNTY, liable on this Agreement or any of the Contract Documents, or upon any warranty of authority, or otherwise, and it is further understood and agreed that liability of COUNTY is limited and confined to such liability as authorized or imposed by the Contract Documents or applicable law.

E. In entering into a Public Works Contract or a Subcontract to supply goods, services or materials pursuant to a Public Works Contract, CONTRACTOR or 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. Section 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 COUNTY tenders final payment to CONTRACTOR, without further acknowledgment by the parties.

F. Copies of the general prevailing rates of per diem wages for each craft, classification, or type of worker needed to execute the Contract, as determined by Director of the State of California Department of Industrial Relations, are deemed included in the Contract Documents and on file at COUNTY's RMA – Public Works, Parks & Facilities Office, and shall be made available to any interested party on request. Pursuant to California Labor Code Sections 1860 and 1861, in accordance with the provisions of Section 3700 of the Labor Code, every CONTRACTOR will be required to secure the payment of compensation to his/her/its employees. CONTRACTOR represents that it is aware of the provisions of Section 3700 of the 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 CONTRACTOR shall comply with such provisions before commencing the performance of the Work set forth in the Contract Documents.

G. COUNTY shall have the right to review all phases of CONTRACTOR's design of deferred submittals including, but not limited to, Drawings, Specifications, Shop Drawings, samples and submittals, as specified in the Contract Documents. Such review and other action shall not relieve CONTRACTOR of its responsibility for a complete design of deferred submittals complying with the requirements of the Contract Documents; but rather, such review shall be in furtherance of COUNTY's monitoring and accepting the design of deferred submittals as developed and issued by the CONTRACTOR, consistent with these Contract Documents. CONTRACTOR's responsibility to design deferred submittals and construct the Project in conformance with the Contract Documents shall be absolute.

H. This Agreement and the Contract Documents shall be deemed to have been entered into in the County of Monterey, State of California, and governed in all respects by California law. The exclusive venue for all disputes or litigation hereunder shall be in the Superior Court for the County of Monterey.

COUNTY OF MONTEREY

By: _____

Name: Carl P. Holm

Title: Director, Resource Management Agency

Date: _____, 2019

APPROVED AS TO FORM

CONTRACTS/PURCHASING

By: _____

Name: Mike Derr

Title: Contracts/Purchasing Officer

Date: _____, 2019

APPROVED AS TO FORM & LEGALITY

OFFICE OF THE COUNTY COUNSEL-RISK
MANAGEMENT, CHARLES J. McKee, County
Counsel- Risk Manager

By: _____

Name: Mary Grace Perry

Title: Deputy County Counsel

Date: _____, 2019

APPROVED AS TO FISCAL TERMS

COUNTY AUDITOR-CONTROLLER

By: _____

Name: Gary Giboney

Title: Chief Deputy Auditor-Controller

Date: _____, 2019

**APPROVED AS TO INDEMNITY/INSURANCE
LANGUAGE**

COUNTY COUNSEL-RISK MANAGEMENT

By: _____

Name: Leslie J. Girard

Title: Chief Assistant

Date: _____, 2019

CONTRACTOR: NAME OF COMPANY

By: _____

Principal Name:

Title:

Date: _____, 2019

By: _____

Principal Name2:

Title:

Date: _____, 2019

COMPANY ADDRESS:

Contractor's License Type:

License Number:

License Expiration Date:

NOTE: CONTRACTORS ARE REQUIRED TO BE LICENSED AND REGULATED BY THE CONTRACTORS' STATE LICENSE BOARD. ANY QUESTIONS CONCERNING A CONTRACTOR MAY BE REFERRED TO THE REGISTRAR, CONTRACTORS' STATE LICENSE BOARD, P O BOX 26000, SACRAMENTO, CALIFORNIA 95826

INSTRUCTIONS: If bidder is a corporation, the full legal name of the corporation shall be set forth above together with the signatures of authorized officers pursuant to California Corporations Code Section 313 and the document shall bear the corporate seal; if bidder is a limited liability corporation (LCC), the full legal name of the LLC shall be set forth above together with the signatures of two managers and the document shall bear the LLC corporate seal; if bidder is a partnership, the full name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts on behalf of the partnership; and if bidder is an individual, his/her signature shall be placed above.

PERFORMANCE BOND
(Public Contract Code Section 20129)
Division 006000

WHEREAS, the County of Monterey has awarded to Principal,

as Contractor, for the following project:

855 EAST LAUREL DRIVE-EMERGENCY SHELTER, PROJECT NO. 8875, BID NO. 10736;
and

WHEREAS, Principal, as Contractor, is required to furnish a bond in connection with said contract, to secure the faithful performance of said contract.

NOW, THEREFORE, we _____

as Principal, and _____

as Surety, are held and firmly bound unto the County of Monterey, a political subdivision of the State of California (hereinafter called "County"), in the penal sum of

_____ Dollars

(\$_____.00), for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

If the Principal, as Contractor, or Principal's heirs, executors, administrators, successors, or assigns, (1) shall in all things stand to and abide by and well and truly keep and perform the covenants, conditions, and agreements in said contract and any alteration thereof made as therein provided, on Principal's part to be kept and performed, at the time and in the manner therein specified and in all respects according to their true intent and meaning, and (2) shall indemnify, defend, and save harmless the County, the members of its board of supervisors, and its officers, agents, and employees as therein stipulated, then this obligation shall become null and void; otherwise, it shall be and remain in full force and virtue.

Surety hereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of the contract or the call for bids, or to the work to be performed thereunder, or the specifications accompanying the same, shall in any way affect its obligation under this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of said contract or the call for bids, or to the work, or to the specifications.

Whenever the Principal, as Contractor, is in default, and is declared in default, under the Contract by the County of Monterey, the County of Monterey having performed its obligation under the contract, Surety may promptly remedy the default, or shall promptly:

1. Complete the contract in accordance with its terms or conditions, or
2. Obtain a bid or bids for submission to County of Monterey for completing the Contract in accordance with its terms or conditions, and upon determination by the County of Monterey and Surety of the lowest responsible and responsive bidder, arrange for a contract between such bidder and the County of Monterey, and make available as work progresses (even though there should be a default or succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price.

If suit is brought upon this bond by the County and judgment is recovered, the Surety shall pay all litigation expenses incurred by the County in such suit, including attorneys' fees, court costs, expert witness fees, and investigation expenses.

IN WITNESS WHEREOF, the above-bounden 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.

(Corporate Seal) _____
Principal

By: _____

Title: _____

(Corporate Seal) _____
Surety

By: _____

Title: _____

Attach: 1) Copy of authorization for signature for Principal, and 2) original or certified copy of unrevoked appointment, Power of Attorney, Attorney-in-Fact Certificate bylaws or other instrument entitling or authorizing person executing bond on behalf of Surety to do so.

PAYMENT BOND
(Civil Code Section 9550)
Division 006100

WHEREAS, the County of Monterey has awarded to Principal,

_____ as Contractor, a contract for the following project:

855 EAST LAUREL DRIVE-EMERGENCY SHELTER, PROJECT NO. 8875, BID NO. 10736;
and

WHEREAS, Principal, as Contractor, is required to furnish a bond in connection with said contract, to secure the payment of claims of laborers, mechanics, material suppliers, and other persons furnishing labor and materials on the project, as provided by law.

NOW, THEREFORE, we _____
as Principal, and _____

_____ as Surety, are held and firmly bound unto the County of Monterey, a political subdivision of the State of California (hereinafter called "County"), and to the persons named in California Civil Code section 9100 in the penal sum of _____ Dollars (\$ _____), for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH THAT:

If Principal or any of Principal's heirs, executors, administrators, successors, assigns, or subcontractors (1) fails to pay in full all of the persons named in Civil Code Section 9100 with respect to any labor or materials furnished by said persons on the project described above, or (2) fails to pay in full all amounts due under the California Unemployment Insurance Code with respect to work or labor performed under the contract on the project described above, or (3) fails to pay for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Principal and subcontractors pursuant to Unemployment Insurance Code section 13020 with respect to such work and labor, then the Surety shall pay for the same.

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

If the County brings suit upon this bond and judgment is recovered, the Surety shall pay all litigation expenses incurred by the County in such suit, including attorneys' fees, court costs, expert witness fees and investigation expenses.

This bond inures to the benefit of any of the persons named in Civil Code section 9100, and such persons or their assigns shall have a right of action in any suit brought upon this bond, subject to any limitations set forth in Civil Code sections 9550 et seq. (Civil Code, Division 4, Part 6, Title 3, Chapter 5: Payment Bond for Public Works).

IN WITNESS WHEREOF the above-bounden 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.

(Corporate Seal) _____
Principal

By: _____

Title: _____

(Corporate Seal) _____
Surety

By: _____

Title: _____

Attach: 1) Copy of authorization for signature for Principal, and 2) original or certified copy of unrevoked appointment, Power of Attorney, Attorney-in-Fact Certificate bylaws or other instrument entitling or authorizing person executing bond on behalf of Surety to do so.

WITHHELD CONTRACT FUNDS CERTIFICATION
Division 006200

PART 1 - GENERAL

1.01 Summary

- A. Public Contract Code Section 22300 requires the inclusion in invitations for public agency bids and in public agency Contracts a provision which will, at the expense of the Contractor, permit the substitution of securities of equal value for any construction progress monies withheld to ensure performance under a Contract. Therefore, as the Contractor for the 855 EAST LAUREL DRIVE-EMERGENCY SHELTER, Project No. 8875, Contractor hereby certifies the following:

I do not intend to substitute securities for monies withheld and thereby avail myself of the process and rights provided in Public Contract Code Section 22300.

I do intend to exercise my option as specified in Public Contract Code Section 22300 and hereby agree to the following:

1. I will establish an escrow Agreement satisfactory to the County, with a state or federally chartered bank, which shall contain at a minimum provisions governing inter alia:
 - a. The amount of securities to be deposited;
 - b. The type of securities to be deposited, (eligible securities for deposit are described in Government Code Section 16430);
 - c. The providing of powers of attorney or other documents necessary for the transfer of the securities deposited;
 - d. The terms and conditions of conversion to cash to provide funds to meet defaults by the Contractor including, but not limited to termination of the Contractor's control over the Work, stop notices filed pursuant to law, assessment of liquidated damages or other amounts to be kept or retained under the provisions of the Contract;
 - e. The decrease in value of securities on deposit; and
 - f. The termination of the escrow Agreement upon completion of the Contract and acceptance by the County.
2. I will obtain written consent of the Surety to any such escrow Agreement; and
3. I will attach to each progress payment submitted a notarized copy of escrow instructions executed by agents thereof and on bank letterhead as proof that such an account has been established. Such instructions will set forth that securities deposited shall not be withdrawn for any purpose (with Contractor's complete and unreserved Agreement) without prior written approval by the County of Monterey with respect to the Project herein above referenced.

Signature of Contractor

END OF DOCUMENT

ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF RETENTION

Division 006290

California Public Contract Code Section 22300

THIS ESCROW AGREEMENT ("Escrow Agreement") is made and entered into this ____ day of _____, 2019, by and between the COUNTY OF MONTEREY, (hereinafter "Owner"), whose _____ address _____ is _____, ("Contractor"), whose place of business is located at _____, Owner, as escrow agent **OR [] (Name of Bank)** _____, a state or federally chartered bank in the State of California, whose place of business is located at _____ ("Escrow Agent").

For the consideration hereinafter set forth, Owner, Contractor and Escrow Agent agree as follows:

1. Pursuant to California Public Contract Code Section 22300, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by Owner pursuant to Contract Number _____ entered into between Owner and Contractor for 855 EAST LAUREL DRIVE-EMERGENCY SHELTER PROJECT NO. 8875 located at 855 East Laurel Drive, Salinas, County of Monterey, in the amount of \$ _____ dated _____, 2019 (the "Contract"). Alternatively, on written request of Contractor, Owner shall make payments of the retention earnings directly to Escrow Agent. When Contractor deposits the securities as a substitute for Contract earnings, Escrow Agent shall notify Owner within ten (10) Days of the deposit. The market value of the securities at the time of substitution shall be at least equal to the cash amount then required to be withheld as retention under terms of Contract between Owner and Contractor. Securities shall be held in name of _____, and shall designate Contractor as the beneficial owner.
2. Owner shall make progress payments to Contractor for those funds which otherwise would be withheld from progress payments pursuant to Contract provisions, provided that Escrow Agent holds securities in the form and amount specified in Paragraph 1 of this Document 006290.
3. When Owner makes payment(s) of retention earned directly to Escrow Agent, Escrow Agent shall hold said payment(s) for the benefit of Contractor until the time that the escrow created under this Escrow Agreement is terminated. Contractor may direct the investment of the payments into securities. All terms and conditions of this Escrow Agreement and the rights and responsibilities of the parties shall be equally applicable and binding when Owner pays Escrow Agent directly.
4. Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account, and all expenses of Owner. Such expenses and payment terms shall be determined by Owner, Contractor, and Escrow Agent.
5. Interest earned on securities or money market accounts held in escrow and all interest earned on that interest shall be for sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to Owner.
6. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from Owner to Escrow Agent that Owner consents to withdrawal of amount sought to be withdrawn by Contractor.
7. Owner shall have the right to draw upon the securities in event of default by Contractor. Upon seven (7) Days written notice to Escrow Agent from Owner of the default, Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by Owner.
8. Upon receipt of written notification from Owner certifying that the Contract is final and complete, and that Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the

Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payments of fees and charges.

9. Escrow Agent shall rely on written notifications from Owner and Contractor pursuant to Paragraphs 5 through 8, inclusive, of this Document 006290 and Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of securities and interest as set forth.
10. Names of persons who are authorized to give written notice or to receive written notice on behalf of Owner and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as set forth below. Owner or Contractor may designate a different person authorized to give or receive written notice on their behalf with 48 hours written notice to the other parties listed below.

ON BEHALF OF OWNER:

ON BEHALF OF CONTRACTOR:

Title

Title

Name

Name

Signature

Signature

Address

Address

City/State/Zip Code

City/State/Zip Code

ON BEHALF OF ESCROW AGENT:

Title

Title

Name

Name

Signature

Signature

Address

Address

City/State/Zip Code

City/State/Zip Code

IN WITNESS WHEREOF, the parties have executed this Escrow Agreement by their proper officers on the date first set forth above.

OWNER:

CONTRACTOR:

COUNTY OF MONTEREY

Signature

Signature

Print/Type Name

Print/Type Name

Title

Title

ATTEST:

Signature

Signature

Print/Type Name

Print/Type Name/Title

Title

ESCROW AGENT

Escrow Agent/Title

Print Name

Signature

REVIEWED AS TO FORM & LEGALITY:
Office of the County Counsel-Risk Management
Charles J. McKee, County Counsel-Risk Manager

Mary Grace Perry, Counsel for Owner

Print Name

Date

At the time the Escrow Account is opened, Owner and Contractor shall deliver to Escrow Agent a fully executed counterpart of this Document 006290.

GUARANTY
Division 006536

TO: The COUNTY OF MONTEREY (“Owner”), for construction of the 855 EAST LAUREL DRIVE-EMERGENCY SHELTER, 855 East Laurel Drive, Salinas, County of Monterey.

The undersigned guarantees all construction performed on this Project and also guarantees all material and equipment incorporated therein.

Contractor hereby grants to Owner for a period of one (1) year following the date of Final Completion of the Work completed, or such longer period specified in Contract Documents, its unconditional warranty of the quality and adequacy of all of the Work including, without limitation, all labor, materials and equipment provided by Contractor and its Subcontractors of all tiers in connection with the Work. Final Completion shall be the date the Monterey County Board of Supervisors accepts all Work as complete.

Neither final payment nor use nor occupancy of the Work performed by the Contractor shall constitute an acceptance of Work not done in accordance with this Guaranty or relieve Contractor of liability in respect to any express warranties or responsibilities for faulty materials or workmanship. Contractor shall remedy any defects in the Work and pay for any damage resulting therefrom, which shall appear within one (1) year, or longer if specified, from the date of Final Acceptance of the Work completed.

If within one (1) year after the date of Final Acceptance of the Work completed, or such longer period of time as may be prescribed by laws or regulations, or by the terms of Contract Documents, any Work is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner’s written instructions, correct such Defective Work. Contractor shall respond within 24 hours after being notified in writing by Owner of any Work not in accordance with the requirements of the Contract or any defects in the Work. Contractor shall commence and prosecute with due diligence all Work necessary to fulfill the terms of this Guaranty, and to complete the Work within a reasonable period of time. Contractor shall remove any Defective Work rejected by Owner and replace it with Work that is not defective, and satisfactorily correct or remove and replace any damage to other Work or the Work of others resulting therefrom. If Contractor fails to promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the Defective Work corrected or the rejected Work removed and replaced. Contractor shall pay for all Claims, costs, losses and damages caused by or resulting from such removal and replacement. Where Contractor fails to correct Defective Work, or defects are discovered outside the correction period, Owner shall have all rights and remedies granted by law.

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

All abbreviations and definitions of terms used in this Agreement shall have the meanings set forth in the Contract Documents.

The foregoing Guaranty is in addition to any other warranties of Contractor contained in the Contract Documents, and not in lieu of, any and all other liability imposed on Contractor under the

Contract Documents and at law with respect to Contractor's duties, obligations, and performance under the Contract Documents. In the event of any conflict or inconsistency between the terms of this Guaranty and any warranty or obligation of the Contractor under the Contract Documents or at law, such inconsistency or conflict shall be resolved in favor of the higher level of obligation of the Contractor.

Date: _____, 20__

Contractor's name

By: _____
Signature

Print Name

Title

Street Address

City, State, Zip code

& By: _____
Signature

Print Name

GENERAL CONDITIONS

Division 007100

PART I INTRODUCTION

ARTICLE 1 DEFINITIONS

1.00 Agreement. "Agreement" means "Contract", including all of the Contract Documents as defined below.

1.01 Architect. The "Architect" is the person or organization identified in the Agreement as Architect, or their authorized representative, or the replacement designated in writing by County.

1.02 Change Order. "Change Order" means a written modification of the Contract between County and Contractor, signed by County, Contractor, Construction Manager, and Architect.

1.03 Change Order Proposal. "Change Order Proposal" means a Contractor generated document in response to a Change Order Request (COR).

1.04 Change Order Request. "Change Order Request" (COR) means a document which informs Contractor of a proposed change in the Work, and appropriately describes or otherwise documents such change.

1.05 Close-Out Documents. "Close-Out Documents" means the product brochures, product/equipment maintenance and operations instructions, manuals, and other documents/warranties, as-built record documents, affidavit of payment, release of lien and Claim, and as may be further defined, identified, and required by the Contract Documents.

1.06 Construction Documents. "Construction Documents" means all Drawings, Specifications, and Addenda associated with a specific construction Project.

1.07 Construction Manager. "Construction Manager" is the entity or person designated by the RMA-Deputy Director of Public Works, Parks & Facilities responsible for the management of the construction component of Project.

1.08 Contract. "Contract" means the entire Agreement between County and Contractor, including all of the Contract Documents.

1.09 Contract Date. "Contract Date" is the date when the Agreement between County and Contractor becomes effective.

1.10 Contract Documents. "Contract Documents" means all executed Agreements between the County and Contractor; any general, supplementary, or other contract conditions; the Drawings and Specifications; all Addenda issued prior to the execution of the Contract; and any other items specifically stipulated as being included in the Contract Documents.

1.11 Contract Sum. The "Contract Sum" is stated in the Agreement and is the total amount payable by County to Contractor for the performance of the Work under the Contract.

1.12 Contract Time. "Contract Time" means the period between the Start Date identified in the Notice to Proceed with Construction and the Substantial Completion Date identified in the Notice to Proceed or as subsequently amended by Change Order.

1.13 Contractor. "Contractor" means the individual, corporation, company, partnership, firm, or other entity contracted to perform the Work and identified as such in the Agreement, or their authorized representative, regardless of the type of construction Contract used, so that the term as used herein includes a Construction Manager, Construction Manager-at-Risk, or a Design-Build firm as well as a General or Prime Contractor. The Contract Documents refer to Contractor as if singular in number.

1.14 Contractor's Project Manager. "Contractor's Project Manager" is the person designated by the Contractor to manage the Work and the Superintendent.

1.15 County. "County" is the County of Monterey, the Owner of the Project and identified as such in the Agreement, or its authorized representative.

1.16 Date of Commencement. "Date of Commencement" means the date designated in the Notice to Proceed for Contractor to commence the Work.

1.17 Drawings. "Drawings" are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including Plans, elevations, sections, details, schedules, and diagrams.

1.18 Final Completion. "Final Completion" means the date on which, after Architect and Construction Manager certify that construction has been completed in accordance with the Contract Documents, the County Board of Supervisors accepts the Work.

1.19 Owner. "Owner" means the County of Monterey.

1.20 Owner's Representative. "Owner's Representative" means the individual assigned by County (Owner) to act on its behalf, and to undertake certain activities as specifically outlined in the Contract. The Owner's Representative is the only party authorized to direct changes to the scope, cost, or time of the Contract.

1.21 Plans. "Plans" means all Drawings, including sections and details; and any supplemental Drawings for complete execution of a specific Project.

1.22 Project. "Project" means all activities necessary for realization of the Work. This includes design, Contract award(s), execution of the Work itself, and fulfillment of all Contract and warranty obligations. The Work performed under this Contract is directed towards completion of all or a part of the Project.

1.23 Project Manager. "Project Manager" is a qualified individual or firm authorized by County to be responsible for coordinating time, equipment, money, tasks and people for all or specified portions of the Project.

1.24 Superintendent. "Superintendent" is the Contractor's representative at the Project Site. The Superintendent directs and coordinates the activities of the various trade groups at the Project Site.

1.25 Samples. "Samples" are representative physical examples of materials, equipment, or workmanship, used to confirm compliance with requirements and/or to establish standards for use in execution of Work.

1.26 Schedule of Values. "Schedule of Values" means the detailed breakdown of the cost of the materials, labor, and equipment necessary to accomplish the Work as described in the Contract Documents, submitted by Contractor for approval by County, Construction Manager, and Architect.

1.27 Shop Drawings. "Shop Drawings" means the Drawings, diagrams, illustrations, schedules, performance charts, brochures, and other data prepared by Contractor or any Subcontractor, manufacturer, supplier, distributor, or agents, and which detail some portion of the Work for fabrication and installation.

1.28 Site. "Site" is the geographical area of the location of Work.

1.29 Specifications. "Specifications" are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards, and workmanship for the Work, and performance of related services.

1.30 Subcontractor. "Subcontractor" is a person or organization who has a direct Contract with Contractor to perform any of the Work at the Site or to furnish material worked to a special design according to Plans and Specifications of this Work. The term "Subcontractor" also includes Sub-subcontractors performing Work at the Site or furnishing specially designed material for the Work, who have only an indirect relationship to Contractor.

1.31 Substantial Completion. "Substantial Completion" means the date determined and certified by Contractor, Architect, Construction Manager and County when the Work or a designated portion thereof is sufficiently complete, in accordance with the Contract, so as to be operational and fit for the use intended.

1.32 Sustainable Objective. "Sustainable Objective" is the County's goal of incorporating sustainable measures into the design, construction, maintenance, and operations of the Project to achieve a Sustainability Certification or other benefit to the environment, to enhance the health and well-being of building occupants, or to improve energy efficiency.

1.33 Work. "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

1.34 Working Drawings. "Working Drawings" mean a Drawing sufficiently complete with plan and section views, dimensions, details, and notes so that whatever is shown can be constructed and/or replicated without instructions but subject to clarifications. (see Drawings)

1.35 Standard Insurance. "Standard Insurance" means all insurance required by Division 007100 Article 32 INDEMNIFICATION AND INSURANCE *other than* Builders Risk/Course of Construction Property Insurance.

1.36 Builders Risk/Course of Construction Property Insurance. "Builders Risk/Course of Construction Property Insurance" means the property insurance required by Division 007100 Section 32.04.02.

1.37 Defective Work. “Defective Work” is Work that, in Owner’s judgment, is unsatisfactory or unsuited for the use intended, faulty, deficient, that does not conform to the Contract Documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the Contract Documents (including, without limitation, approval of samples and “or equal” items), or has been damaged prior to final payment (unless responsibility for the protection thereof has been assumed by Owner). Unapproved substitutions are defective.

ARTICLE 2 CONTRACT INTERPRETATION

2.01 Counting time. When any provision in the Contract Documents calls for computation of time in terms of days, the period so counted shall include all calendar days within the period, including usual Work days as well as weekends and holidays. Business Days and Work days refer to Monday through Friday, eight (8) hour duration.

2.02 Gender and number. References to one gender include the other; references to either singular or plural include the other.

2.03 Headings. Article and paragraph headings are for convenience only, and shall not be used to interpret the provisions of this Contract.

2.04 Express and implied Work requirements. This Contract requires the performance of all elements of Work expressly mentioned herein, together with all elements of Work that are reasonably inferable from the express terms of this Contract as being necessary for the proper completion of the Work.

2.05 Technical or trade meanings. Words which have well known technical or trade meanings are used herein in accordance with such recognized meanings.

2.06 Interpretations by Architect. Written interpretations necessary for the proper execution or progress of the Work, in the form of Drawings or otherwise, will be issued with reasonable promptness by Architect and in accordance with any schedule agreed upon. Contractor shall make written request to Architect for such interpretations. Such interpretations shall be consistent with, and reasonably inferable from the Contract Documents, and may be made by field orders issued pursuant to Article 18.

2.07 Conflicts among Contract Documents - priorities. Contract Documents are complementary; what is called for by one is as binding as if called for by all. If there is any conflict between any of the Contract Documents, the conflict shall be resolved by giving effect to the provisions in the documents having higher priority and by disregarding conflicting provisions in documents having lower priority, as follows: first priority, any modifications, with the most recent having priority over earlier modifications; second priority, the Agreement; third priority, any Addenda, with the most recent having priority over earlier Addenda; fourth priority, the Supplementary Conditions; and fifth priority, the General Conditions.

A. In the case of discrepancy or ambiguity in the Contract Documents, the following order of precedence shall prevail:

1. Modifications in inverse chronological order (i.e., most recent first), and in the same order as specific portions they are modifying;
2. Agreement Forms (Document 005000), and terms and conditions referenced therein;
3. Supplementary General Conditions (Document 007301 et seq), if included;

4. General Conditions (Document 007100);
 5. Division 1 Specifications, if included;
 6. Drawings and Technical Specifications (Division 2 and above);
 7. Written numbers over figures, unless obviously incorrect;
 8. Figured dimensions over scaled dimensions;
 9. Large-scale Drawings over small-scale Drawings.
- B. Any conflict between Drawings and Technical Specifications (Division 2 and above) will be resolved in favor of the document of the latest date (i.e., the most recent document), and if the dates are the same or not determinable, then in favor of Specifications.
- C. Any conflict between a bill or list of materials shown in the Contract Documents and the actual quantities required to complete Work required by Contract Documents, will be resolved in favor of the actual quantities.
- D. All Technical Specifications included in the Project manual shall be included within the Contract Documents unless identified otherwise.

ARTICLE 3 CONTRACT DOCUMENTS

3.01 Contract Documents. Contract Documents consist of all component parts of the Contract as specified in the Agreement.

3.02 Contract. The Contract Documents form the Contract. The Contract represents the entire and integrated Agreement between the parties hereto and supersedes all prior negotiations, representations, or Agreements, either written or oral, including the bidding documents. The Contract may be amended or modified only by a modification as defined in Section 3.03. No Contractor or Subcontractor may be awarded a Contract for Public Works on a Public Works Project (awarded on or after April 1, 2015) unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5.

3.03 Modification. A modification is (1) a written amendment to the Contract signed by both parties (2) a Change Order (3) a written interpretation issued by Architect or (4) a written order for a minor change in the Work issued by Architect pursuant to Article 18. A modification may be made only after execution of the Contract.

3.04 Execution in quadruplicate. Unless otherwise specified in the Agreement, the Contract Documents shall be signed in not less than quadruplicate by County and Contractor.

3.05 Familiarity with Site and local conditions.

A. Prior to submitting a bid, and prior to executing this Contract, Contractor shall visit the Work site, familiarize himself/herself/itself with the local conditions under which the Work is to be performed, and correlate his/her observations with the requirements of this Contract. Contractor's investigation shall include, without limitation, requesting and thoroughly examining of all reports of exploration and tests of subsurface conditions, as-built Drawings, Drawings, product Specification(s) or reports, made available by Owner for contracting purposes or during Contractor's pre-bid investigations, of existing above ground and (to the extent applicable) below ground conditions (together, "Existing Conditions Data"), including, as applicable, Underground Facilities, geotechnical data, as-built data, utility surveys, record documents of all types, hazardous materials surveys, or similar materials which may appear or be referenced in the Project Manual or the in the Contract Documents, and all local conditions, and federal, state and local laws and regulations that in any manner may affect cost, progress, performance or furnishing of Work or which relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by

Contractor and safety precautions and programs incident thereto.

B. Contractor's investigations shall consider fully the fact that Existing Conditions Data is in many cases based on information furnished to Owner by others (e.g., the prior owner or builders), and that due to their age or their chain of custody since preparation, may not meet current industry standards for accuracy. Contractor shall also: (i.) provide Owner with prompt written notice of all conflicts, errors, ambiguities, or discrepancies of any type, that it discovered in or among the Contract Documents and the Existing Conditions Data, and (ii.) subject to Owner's approval, conduct any such additional or supplementary examinations, investigations, explorations, tests, studies and data compilations, concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site or otherwise, which Contractor may deem necessary in order to perform and furnish the Work in accordance with the terms and conditions of Contract Documents.

C. By executing the Contract, Contractor represents that he/she/it has familiarity with Site and local conditions. Based on such visits and investigations, Contractor shall notify County, in writing, of any discrepancies between the local conditions and the requirements of the Contract. Contractor's failure to notify County prior to submitting its bid shall be deemed an acknowledgment of and acceptance of any such discrepancies, and a waiver of any Claims for extra Work, which may result therefrom.

D. During performance of the Contract, Contractor will be charged with knowledge of all information that it should have learned in performing these pre-bid investigations and other obligations, and shall not be entitled to Change Orders (time or compensation) due to any information, error, inconsistency, omission, or conditions that Contractor should have known as a part of this Work. Contractor shall be responsible for the resultant losses, including, without limitation, the cost of correcting Defective Work.

3.06 Limited Reliance Permitted On Owner's Existing Conditions Data

A. Information regarding aboveground and as-built conditions shown on the Contract Documents or supplied by Owner has been compiled in good faith. However, Owner does not expressly or impliedly warrant or represent that such information is correctly shown or indicated, or otherwise complete for construction purposes. Contractor must independently verify such information as part of its pre-bid investigations, and where conditions are not reasonably verifiable or discrepancies are identified, bring such matters to Owner's attention through written question issued during the bid period. In executing Document 005000 (Agreement), Contractor shall rely on the results of its own independent investigation and shall not rely on Owner supplied information regarding aboveground conditions and as-built conditions, and Contractor shall accept full responsibility for its verification Work sufficient to complete the Work as intended.

B. Regarding subsurface conditions other than Underground Facilities shown on the Contract Documents or otherwise supplied by Owner, Contractor may rely only upon the general accuracy of actual reported depths, actual reported character of materials, actual reported soil types, actual reported water conditions, or actual obstructions shown or indicated in the Contract Documents. Owner is not responsible for the completeness of any subsurface condition information, Contractor's conclusions or opinions drawn from any subsurface condition information, or subsurface conditions that are not specifically shown. (For example, Owner is not responsible for soil conditions in areas contiguous to areas where a subsurface condition is shown.)

3.07 Pre-Bid Investigation Requirements For Excavation And Utilities Relocation Projects

A. As part of its pre-bid investigations for Projects involving excavation and/or relocation of existing utilities, Contractor shall make reasonable efforts to verify information regarding Underground Facilities, including but not limited to, requesting additional information or verification of information as necessary.

B. Because of the nature and location of Owner and the Project, the existence of Underground Facilities is deemed inherent in the Work of the Contract, as is the fact that Underground Facilities are not always accurately shown or completely shown on as-built records, both as to their depth and location. Contractor shall, therefore, take care to note the existence and potential existence of Underground Facilities, in particular, above and below grade structures, drainage lines, storm drains, sewers, water, gas, electrical, chemical, hot water, and other similar items and utilities. Contractor shall carefully consider all supplied information, request additional information Contractor may deem necessary, and visually inspect the Site for above ground indications of Underground Facilities (such as, for example not by way of limitation, the existence of existing service laterals, appurtenances or other types of utilities, indicated by the presence of an underground transmission main or other visible facilities, such as buildings, new asphalt, meters and junction boxes, on or adjacent to the Site). Contractor shall also consider local underground conditions and typical practices for Underground Facilities, either through its own direct knowledge or through its Subcontractors, and fully consider this knowledge in assessing the existing information and the reasonableness of its reliance.

3.08 Contract Documents furnished to Contractor. Unless otherwise provided in the Contract Documents, Contractor will be furnished, one full size set and one half size set of all the Contract Documents, including the Plans, Specifications, and working details to facilitate the execution of the Work. Additional copies of the Contract Documents may be obtained at cost of reproduction.

3.09 Ownership of documents. All Plans, Specifications, working details, and copies thereof furnished by Architect are and shall remain the property of County. Such documents shall not be used on any other Project and shall be returned to County on request at the completion of the Work.

3.10 Organization of Contract Documents not controlling. The organization of the Specifications into divisions, sections, and articles, and the arrangement of the Plans or working details shall not control Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

3.11 Contract Documents on-site. Contractor will at all times maintain at least one complete, up-to-date set of the Contract Documents, showing approval by the State Fire Marshal (including the original documents as well as all Change Orders and other supplemental and additional documents) on the Site, to be available to County, Architect, and their representatives.

ARTICLE 4 SUBCONTRACTORS

4.01 Subcontractor Listing Law

- A. Contractor shall comply with the Subcontractor Listing law, California Public Contract Code Sections 4101 et seq. Contractor shall not substitute any other person or firm in place of any Subcontractor listed in the Bid except as may be allowed by law.
- B. Subcontractors shall not assign or transfer their Subcontracts or permit them to be performed by any other Contractor without Owner's written approval. At Owner's request, Contractor shall provide Owner with a complete copy of all executed Subcontracts or final commercial

Agreements with Subcontractors and/or suppliers.

- C. No contractual relationship between County and Subcontractors. Nothing contained in the Contract Documents shall create any contractual relation between County, Architect, or Construction Manager, and any Subcontractor.

4.02 Subcontracts

- A. Subcontract Agreements shall preserve and protect the rights of Owner under the Contract Documents so that subcontracting will not prejudice such rights. To the extent of the Work to be performed by a Subcontractor, Contractor shall require the Subcontractor's written Agreement (1) to be bound to the terms of Contract Documents and (2) to assume vis-à-vis Contractor all the obligations and responsibilities that Contractor assumes toward Owner under the Contract Documents. (These Agreements include for example, and not by way of limitation, all warranties, Claims procedures and rules governing submittals of all types to which Contractor is subject under the Contract Documents.)
- B. Contractor shall provide for the assignment to Owner of all rights any Subcontractor (of any tier) may have against any manufacturer, supplier, or distributor for breach of warranties and guarantees relating to the Work performed by the Subcontractor under the Contract Documents. Subcontracts shall provide and acknowledge Owner as an intended third-party beneficiary of each Subcontract and supply Contract (of any tier).

4.03 Contracts with Subcontractors. All Work performed for Contractor by a Subcontractor shall be pursuant to a written Agreement between Contractor and the Subcontractor (and where appropriate, between Subcontractors and Sub-subcontractors). All such Agreements shall require performance by the Subcontractors in conformity with the terms of this Contract, and shall include all the terms of this Contract, which are applicable to Subcontractors.

4.04. Payments to Subcontractors.

A. Contractor shall pay each Subcontractor, upon receipt of payment from County, an amount equal to the percentage of completion allowed to Contractor on account of such Subcontractor's Work, less the percentage retained from payments to Contractor. Contractor shall also require each Subcontractor to make similar payments to its Subcontractors. County shall have the right, but not the obligation, to issue payment by joint checks payable to the order of Contractor and any of its Subcontractors.

B. If the Construction Manager fails to issue a certificate for payment for any cause which is the fault of Contractor and not the fault of a particular Subcontractor, Contractor shall pay the Subcontractor on demand, made at any time after the certificate for payment should otherwise have been issued, for his/her/its Work to the extent completed, less the retained percentage.

C. Neither County nor Construction Manager shall have any obligation to pay or to see to the payment of any monies to any Subcontractor except as may otherwise be required by law. All monies paid to Contractor hereunder shall immediately become and constitute a trust fund and shall be applied by Contractor for the benefit of all persons supplying labor, materials, or equipment in connection with the Work and shall not be diverted to any other purpose until the Claims of such persons have been discharged.

4.05 Information provided to Subcontractors. Construction Manager, County, and Architect may, on request, and at their discretion, furnish to any Subcontractor, if practicable, information regarding percentages of completion certified to Contractor on account of work done by such Subcontractors.

4.06 Contractor's responsibility for Work of Subcontractors. Contractor shall be as fully responsible to County for the acts and omissions of any Subcontractor and of persons either directly or indirectly employed by the Subcontractors, as Contractor is for acts and omissions of persons directly employed by him/her/it.

ARTICLE 5: DRAWINGS AND SPECIFICATIONS

5.01 Intent of Drawings and Specifications

- A. Contractor shall interpret words or phrases used to describe Work (including services), materials, or equipment that have well known technical or construction industry or trade meaning in accordance with that meaning. Drawings and Specifications specifically include the intent to depict construction that complies with all applicable laws, codes and standards.
- B. As part of the "Work," Contractor shall provide all labor, materials, equipment, machinery, tools, facilities, services, employee training and testing, hoisting facilities, Shop Drawings, storage, testing, security, transportation, disposal, the securing of all necessary or required field dimensions, the cutting or patching of existing materials, notices, permits, documents, reports, Agreements and any other items required or necessary to timely and fully complete Work described and the results intended by Contract Documents and, in particular, Drawings and Specifications. Divisions and Specification Sections and the identification on any Drawings shall not control Contractor in dividing Work among Subcontractors or suppliers or delineating the Work to be performed by any specific trade.
- C. Contractor shall perform reasonably implied parts of Work as "Incidental Work" although absent from Drawings and Specifications. Incidental Work includes any Work not shown on Drawings or described in Specifications that is necessary or normally or customarily required as a part of the Work shown on Drawings or described in Specifications. Incidental Work includes any Work necessary or required to make each installation satisfactory, legally operable, functional, and consistent with the intent of Drawings and Specifications or the requirements of Contract Documents. Contractor shall perform Incidental Work without extra cost to Owner. Incidental Work shall be treated as if fully described in Specifications and shown on Drawings, and the expense of Incidental Work shall be included in price Bid and Contract Sum.

5.02 Checking Of Drawings And Specifications

- A. Before undertaking each part of Work, Contractor shall carefully study and compare Contract Documents and check and verify pertinent figures shown in the Contract Documents and all applicable field measurements. Contractor shall be responsible for any errors that might have been avoided by such comparison. Figures shown on Drawings shall be followed; Contractor shall not scale measurements. Contractor shall promptly report to Owner, in writing, any conflict, error, ambiguity or discrepancy that Contractor may discover. Contractor shall obtain a written interpretation or clarification from Owner before proceeding with any Work affected thereby. Contractor shall provide Owner with a follow-up correspondence every ten (10) days until it receives a satisfactory interpretation or clarification.

5.03 Interpretation Of Drawings And Specifications

- A. A typical or representative detail on Drawings shall constitute the standard for workmanship and material throughout corresponding parts of Work. Where necessary, and where reasonably inferable from Drawings, Contractor shall adapt such representative detail for application to such corresponding parts of Work. The details of such adaptation shall be subject to prior approval

by Owner. Repetitive features shown in outline on Drawings shall be in exact accordance with corresponding features completely shown.

- B. Should any discrepancy appear or any misunderstanding arise as to the import of anything contained in Drawings and Specifications, or should Contractor have any questions or requests relating to Drawings or Specifications, Contractor shall refer the matter to Owner, in writing, with a copy to the Architect. Owner will issue with reasonable promptness written responses, clarifications or interpretations as Owner may determine necessary, which shall be consistent with the intent of and be reasonably inferable from Contract Documents. Such written clarifications or interpretations shall be binding upon Contractor. If Contractor believes that a written response, clarification or interpretation justifies an adjustment in the Contract Sum or Contract Time, Contractor shall give Owner prompt written notice. If the parties are unable to agree to the amount or extent of the adjustment, if any, then Contractor shall perform the Work in conformance with Owner's response, clarification, or interpretation and may make a written Claim for the adjustment as provided in Article 33.
- C. The following general Specifications shall apply wherever in the Specifications, or in any directions given by Owner in accordance with or supplementing Specifications, it is provided that Contractor shall furnish materials or manufactured articles or shall do Work for which no detailed Specifications are shown. Materials or manufactured articles shall be of the best grade, in quality and workmanship, obtainable in the market from firms of established good reputation. If not ordinarily carried in stock, the materials or manufactured articles shall conform to industry standards for first class materials or articles of the kind required, with due consideration of the use to which they are to be put. Work shall conform to the usual standards or codes, such as those cited herein, for first class Work of the kind required. Contractor shall specify in writing to Owner the materials to be used or Work to be performed under this Section ten (10) Business Days prior to furnishing such materials or performing such Work.

5.04 Use Of Drawings And Specifications. Drawings, Specifications and other Contract Documents were prepared for use for Work of Contract Documents only. No part of Contract Documents shall be used for any other construction or for any other purpose except with the written consent of Owner. Any unauthorized use of Contract Documents is prohibited and at the sole liability of the user.

PART II CONDUCT OF WORK

ARTICLE 6 CONTRACT ADMINISTRATION BY ARCHITECT AND CONSTRUCTION MANAGER

6.01 No contractual relationship between Architect, Construction Manager, and Contractor. Nothing contained in the Contract Documents shall create any contractual relationship between Architect, Construction Manager, and Contractor or any Subcontractor.

6.02 The Role of the Architect and Construction Manager. The Architect and Construction Manager will be County's representatives during construction and until final payment as provided in this Agreement. The Architect and the Construction Manager will have authority to act on behalf of County to the extent provided in the Contract Documents, unless otherwise modified by written instrument which will be shown to Contractor. Construction Manager will advise and consult with County, and all of County's instructions to Contractor shall be issued through the Construction Manager. The Construction Manager will provide general administration of the contract, including performance of the functions hereinafter described. The Construction Manager will provide management of construction in the field. The Construction Manager is responsible for managing the

construction schedule, construction budget, and has the authority to act on behalf of County as relating to the management of these items.

6.03 Instructions issued through Construction Manager. County shall issue instructions to Contractor through the Construction Manager, provided that County shall have the right, but not the obligation, to itself or through other Project representatives to issue Change Orders, require additional Work and/or direct the omission of Work previously ordered by written instructions directly to Contractor, provided such Project representative and instructions have been previously approved, in writing, by County.

6.04 Construction Manager, and Architect access to Work. County, Construction Manager, and Architect shall at all times have access to the Work wherever it is in preparation and progress. Contractor shall provide facilities for such access so County, Construction Manager, and Architect may perform their functions under the Contract.

6.05 Inspections. Architect will make periodic visits to the Site to familiarize himself/herself generally with the progress and quality of the Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. On the basis of his/her on-site observations, he/she will keep County informed of the progress of the Work, and will endeavor to guard County against defects and deficiencies in the Work of Contractor. Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. They will not be responsible for construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs in connection with the Work, and they will not be responsible for Contractor's failure to carry out the Work in accordance with the Contract Documents, except to the extent such failure is due to Architect's breach of Agreement with County or is otherwise due to the negligence or willful misconduct of Architect.

6.06 Determination of payments to Contractor. Based on such observations and Contractor's applications for payment, Architect and Construction Manager will determine the amounts owing to Contractor and will issue certificates for payment in such amounts, as provided in Article 21.

6.07 Decisions on artistic effect. Architect's decisions in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents.

6.08 Authority to reject Work or to require special inspection or testing. Construction Manager and Architect may reject Work which does not conform to the Contract Documents. Whenever, in their reasonable opinion, they consider it necessary or advisable to ensure the proper implementation of this Contract, they may require special inspection or testing of the Work in accordance with Article 13, whether or not such Work is then fabricated, installed, or completed. However, the Construction Manager's and Architect's authority to act under this Section, nor any decision made by them in good faith either to exercise or not to exercise such authority, shall not give rise to any duty or responsibility of Construction Manager or Architect to Contractor, any Subcontractor, any of their agents or employees, or any other person performing any of the Work.

6.09 Review of Shop Drawings and Samples. Architect will review Shop Drawings and samples as provided in Article 8.

6.10 Change Orders prepared by Construction Manager. Construction Manager will prepare Change Orders and may order minor changes in the Work in accordance with Article 18.

6.11 Inspections and document review. Construction Manager will conduct inspections of the Work (including a final inspection); receive and review written guarantees and related documents required by the Contract and assembled by Contractor; and issue a final certificate for payment.

6.12 Communications Facilitating Contract Administration. Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Construction Manager, and shall contemporaneously provide the same communications to the Architect about matters arising out of or relating to the Contract Documents. Communications by and with Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with the County's own forces shall be through the County designee.

ARTICLE 7 SERVICES PROVIDED BY COUNTY

7.01 Easements obtained by County. County shall secure and pay for all easements, rights-of-way, and fee interests in land necessary to enable Contractor to complete the Work.

7.02 Surveys provided by County. County shall furnish all surveys describing the existing physical characteristics, legal limits, and utility locations for the Site of the Project. Unless specifically provided for in the Plans and Specifications, County shall not provide field engineering or construction staking.

7.03 Information and services provided by County. Information or services under County's control shall be furnished by County with reasonable promptness to avoid delay in the orderly progress of the Work. The County shall endeavor to forward all communications to the Contractor through the Construction Manager and shall contemporaneously provide the same communication to the Architect about matters arising out of or relating to the Contract Documents.

ARTICLE 8 - OWNER'S ADMINISTRATION OF WORK

8.01 Owner's Representative(s)

Owner's Representative(s) will have limited authority to act on behalf of Owner as set forth in the Contract Documents.

8.02 Owner's Observation Of The Work

A. Work shall be performed under Owner's general observation and administration. Contractor shall comply with Owner's directions and instructions in accordance with the terms of Contract Documents, but nothing contained in these General Conditions shall be taken to relieve Contractor of any obligations or liabilities under the Contract Documents. Owner's failure to review or, upon review, failure to object to any aspect of Work reviewed, shall not be deemed a waiver or approval of any nonconforming aspect of Work.

B. Subject to those rights specifically reserved in the Contract Documents, Owner will not supervise, or direct, or have control over, or be responsible for, Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, or Contractor's failure to comply with laws and regulations applicable to the furnishing or performance of Work. Owner will not be responsible for Contractor's failure to perform or furnish the

Work in accordance with Contract Documents.

8.03 Architect's Observation Of Work

A. Owner may engage an Architect, an independent consultant or Project Manager (collectively for purposes of this Section, "Project Manager/Architect") to assist in administering the Work. If so engaged, Project Manager/Architect will advise and consult with Owner, but will have authority to act on behalf of Owner only to extent provided in the Contract Documents or as set forth in writing by Owner. Project Manager/Architect will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with Work. Project Manager/Architect will not be responsible for or have control over the acts or omissions of Contractor, Subcontractors or their agents or employees, or any other persons performing Work.

B. Project Manager/Architect may review Contractor's submittals, such as Shop Drawings, product data, and samples, but only for conformance with design concept of Work and with information given in the Contract Documents.

C. Project Manager/Architect may visit the Site at intervals appropriate to stage of construction to become familiar generally with the progress and quality of Work and to determine in general if Work is proceeding in accordance with Contract Documents. Based on its observations, Project Manager/Architect may recommend to Owner that it disapproves or rejects Work that Project Manager/Architect believes to be defective or will not produce a complete Project that conforms to Contract Documents or will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by Contract Documents. Owner will also have authority to require special inspection or testing of Work, whether or not the Work is fabricated, installed or completed.

D. Project Manager/Architect may conduct inspections to recommend to Owner the dates that Contractor has achieved Substantial Completion and Final Completion, and will receive and forward to Owner for review written warranties and related documents required by Contract Documents.

8.04 Owner's And Architect's Exercise Of Contract Responsibilities

A. Owner, Project Manager, Architect and all Owner's representatives, in performing their duties and responsibilities under the Contract Documents, accept no duties, responsibilities or duty of care, nor may the same be implied or inferred, towards Contractor, any Subcontractor, Sub-subcontractor or supplier, except those set forth expressly in the Contract Documents.

8.05 Owner's Right Of Access To The Work. During performance of Work, Owner and its agents, consultants, and employees may at any time enter upon Work, shops or studios where any part of the Work may be in preparation, or factories where any materials for use in Work are being or are to be manufactured, and Contractor shall provide proper and safe facilities for this purpose, and shall make arrangements with manufacturers to facilitate inspection of their processes and products to such extent as Owner's interests may require. Other Contractors performing Work for Owner may also enter upon Work for all purposes required by their respective Contracts. Subject to the rights reserved in the Documents, Contractor shall have sole care, custody, and control of the Site and its Work areas.

8.06 Owner's Right Of Separate Construction

A. Owner may perform with its own forces, construction or operations related to the Project, or the Site during Contractor's operations. Owner may also award separate Contracts in connection with other portions of the Project or other construction or operations, on the Site or areas contiguous to the Site, under conditions similar to these Contract Documents, or may have utility Owners perform other Work.

B. Contractor shall adjust its schedule and fully coordinate with and shall afford all other Contractors, utility districts and Owner (if Owner is performing Work with its own forces), proper and safe access to the Site, and reasonable opportunity for the installation and storage of their materials. Contractor shall ensure that the execution of its Work properly connects and coordinates with others' Work, do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other Work, and shall cooperate with them to facilitate the progress of the Work.

C. To the extent that any part of Contractor's Work is to interface with Work performed or installed by other Contractors or utility owners, Contractor shall inspect and measure the in-place Work. Contractor shall promptly report to Owner in writing any defect in in-place Work that will impede or increase the cost of Contractor's interface unless corrected.

ARTICLE 9 CONTRACTOR'S ADMINISTRATIVE DUTIES

9.01 Review of Contract Documents for errors. Contractor shall carefully study and compare the Contract Documents and shall, at once, report, in writing, to Architect, with a copy to Construction Manager, any error, inconsistency, or omission he/she may discover. Contractor shall not be liable to County or Architect for any damage resulting from any such errors, inconsistencies, or omissions in the Contract Documents which were reported, in writing, by Contractor to Architect, with a copy of the correspondence to Construction Manager, provided no provisions herein shall relieve Contractor from liability for errors, inconsistencies, or omissions which were known or reasonably should have been known to Contractor, which were not disclosed in writing to Architect, with a copy of the correspondence to Construction Manager.

9.02 Taxes. Contractor shall pay all sales, consumer, use, and other similar taxes required by law.

9.03 Transportation and utility service. Contractor shall pay for all transportation and utility service not later than the 20th day of the calendar month following that in which such services are rendered.

9.04 Contractor's Superintendent. Contractor shall employ a competent, qualified Superintendent who shall provide full time, on-site supervision of all aspects of the Work. Full time means any and all times that Contractor, its agents, employees, or Subcontractors are performing any and all Work. The Contractor, as soon as practicable after award of the Contract, shall furnish, in writing, to County and Architect through Construction Manager, the name and qualifications of a proposed Superintendent. The Construction Manager may reply within fourteen (14) days to the Contractor in writing state (1) whether County, the Construction Manager, or Architect has reasonable objection to the proposed Superintendent or (2) that any of them require additional time to review. Failure of the Construction Manager to reply within the fourteen (14) day period shall constitute notice of no reasonable objection. The Superintendent shall be satisfactory to County, Construction Manager, or Architect and shall not be changed except with the consent of County. County may request at any time that a Contractor remove its Superintendent from the Project and provide an alternate Superintendent as approved by

County. The Superintendent shall represent Contractor and all communications given to the superintendent shall be as binding as if given to Contractor. Important communications will be confirmed in writing. Other communications will be so confirmed on written request in each case.

9.05 Contractor's Project Manager. Contractor shall employ a competent, qualified Project Manager to manage the entire construction Project and the Superintendent. Contractor shall provide Construction Manager with the Contractor's Project Manager's résumé. County and Architect must approve the Contractor's Project Manager. County reserves the right to interview the Project Manager at any time. County at any time during the course of construction may require Contractor to substitute the Project Manager based on poor performance, lack of experience, product knowledge, Project management skills, or the ability to prosecute the Work in a workmanlike manner.

9.06 Contractor's responsibility for agents and employees. Contractor shall employ, and shall permit its Subcontractors to employ, only competent and skillful personnel to do Work. If Owner notifies Contractor that any of its employees, or any of its Subcontractors' employees on Work is incompetent, unfaithful, disorderly or profane, or fails to observe customary standards of conduct or refuses to carry out any provision of the Contract Documents, or uses threatening or abusive language to any person on Work representing Owner, or violates sanitary rules, or is otherwise unsatisfactory, and if Owner requests that such person be discharged from Work, then Contractor or its Subcontractor shall immediately discharge such person from Work and the discharged person shall not be re-employed on the Work except with consent of Owner. Contractor shall be responsible to County for the acts and omissions of all his/her/its employees and all Subcontractors, their agents, and employees, and all other persons performing any of the work under a Contract with Contractor.

9.07 Communication through Construction Manager.

A. Contractor shall forward all communications to County through the Construction Manager.

B. Except as otherwise provided in these Contract Documents or subsequently identified in writing by Owner, Owner will issue all communications to Contractor through Owner's Representative, and Contractor shall issue all communications to Owner through Owner's Representative in a written document delivered to Owner.

C. Should any direct communications between Contractor and Owner's consultants, architects or engineers occur during field visits or by telephone, Contractor shall immediately confirm them in a written document copied to Owner.

D. All communications recognized under the Contract Documents shall be submitted using a computerized cloud based document control and storage system (hereafter referred to in this Section as "System"). This excludes documents requiring signatures as outlined in 9.08 B. Electronic transfer of such correspondence shall be submitted using the System, rather than email. Generally, email communication shall be avoided and all official communication shall be submitted through the System.

E. The general Contractor and Subcontractors' use and access to such System will be as established by the County. The Contractor and their Subcontractors' use of the System will be without charge or expense provided, however, the Contract Time and the Contract Sum shall not be subject to adjustment on account of the use of the System or training of the Contractor and their Subcontractors' personnel on the use and functions of the System. All Project Documents such as; submittals, Requests For Information (RFI), Payment Application, Change Order Requests, Daily Reports, Change Orders and any other miscellaneous Project Documents will be received and processed by the County in an

electronic form through the System.

9.08 Communications And Information Distribution.

A. All communications recognized under the Contract Documents shall be in writing, in the form of a serialized document, by type of communication. For example, RFI's shall be serialized beginning with RFI No. 1; payment applications shall be serialized beginning with Payment Application No. 1, submittals shall be serialized per Specification Section and transmitted with transmittal sheets beginning with Transmittal No. 1; and correspondence shall be serialized beginning with letter No. 1. Contractor may propose other record management and identification systems or protocols, intended to facilitate orderly transmittal of Project information, storage and retrieval of such information, which Owner will review consistent with these stated objectives, and accept or reject in its sole discretion.

B. Documents Requiring Signatures. All documents requiring signatures for approval prior to implementing action, as stipulated in other portions of Contract Documents, shall require a manually signed, serialized letter delivered to the other party at its address for notice otherwise specified in the Contract Documents, either personally or by mail.

C. Electronic data transfer of such correspondence will serve to expedite preliminary concurrence of information, only. Receipt of "hard copy" signature on forms is required prior to implementing action or Work as the conditions may require. For example, Change Orders and authorizations for extra cost, require signatures. A party may acknowledge receipt of PDF copies of required correspondence by email, but in the absence of such acknowledgment, mail or personal delivery is required.

D. All emails shall be copied to Owner, Construction Manager, Architect, and Contractor's Superintendent/Project Manager. Owner reserves the right to preclude email communication, in whole or in part, as Project needs may require. Communication between Owner and Contractor shall not be via Twitter, Facebook, or other types of instant text message systems. Any such communications shall be inadmissible for any purpose related to this Contract.

ARTICLE 10 GENERAL PROVISIONS REGARDING CONDUCT OF WORK

10.01 No Work without Construction Documents. Contractor shall do no Work without current Plans, Specifications, working details, etc.

10.02 Supervision and construction procedures. Contractor shall supervise and direct the Work, using his/her/its best skill and attention. Contractor shall be solely responsible for all construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract.

10.03 Contractor's responsibility for labor, materials, and equipment. Unless otherwise specifically noted, Contractor shall provide and pay for all labor, materials, equipment, and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work.

10.04 Conduct and skill of employees. Contractor shall at all times enforce strict discipline and good order among Contractor's employees and shall not employ on the Work any unfit person or anyone not skilled in the task assigned to him/her. Any person in the employ of Contractor whom County may deem incompetent or unfit shall be dismissed from the Work and shall not again be employed on it except with the written consent of County.

10.05 Contractor's Construction Schedule. Contractor, immediately after being awarded the Contract, shall prepare and submit for County's and Architect's information and the Construction Manager's approval, an estimated Construction Schedule for the Work. The Construction Schedule shall be related to the entire Project to the extent required by the Contract Documents. The Construction Schedule shall indicate the dates for the starting and completion of the various stages of construction and shall be revised weekly, subject to Architect's approval. The Contractor shall cooperate with the Construction Manager in scheduling and performing the Contractor's Work to avoid conflict with, and as to cause no delay in, the construction or operations of the Owner's own forces. The Contractor shall make revisions to the Construction Schedule as deemed necessary by the Construction Manager to conform to the Project Schedule.

10.06 Dimensions to be checked. All dimensions shall be carefully checked by the various artisans. Each Contractor shall be held responsible for the accuracy of the dimensions of its own Work. Dimensions shown on Plans shall be adhered to insofar as it is possible, and no deviation from such dimensions shall be made except with the consent of Architect. Where the Work of one Contractor comes in contact with the Work of another Contractor, each Contractor shall carefully check all dimensions which affect its own Work. Wherever possible, dimensions shall be taken at the building, but no Work shall be delayed or held up waiting for building dimensions, when by the exercise of foresight and proper cooperation, the dimensions may be established in advance of construction. Contractor shall verify all dimensions at the Site and shall be solely responsible for same or deviations from same.

10.07 Cutting and patching. Contractor shall be responsible for any cutting, fitting, and patching that may be required to complete his/her/its Work, except as otherwise specifically provided in the Contract Documents. Contractor shall not endanger any Work of any other Contractors by cutting, excavating, or otherwise altering any Work and shall not cut or alter the Work of any other Contractor except with the written consent of Construction Manager.

10.08 Revision of operations. When, in the judgment of County, it becomes necessary to accelerate the Work, Contractor when so ordered shall concentrate Contractor's forces at such points as directed and execute such portions of the Work as may be required.

10.09 Damage to Work and property on-site. All damage or loss to any property on or near the Site caused in whole or in part by Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable, shall be remedied by Contractor, at Contractor's expense, except damage or loss attributable to faulty Specifications or working details, or to the acts or omissions of County, Construction Manager, Architect, or anyone employed by either of them, or for whose acts either of them may be liable, and not attributable to the fault or negligence of Contractor.

ARTICLE 11 SHOP DRAWINGS AND SAMPLES

11.01 Submittal of Shop Drawings and samples. Contractor shall review, stamp with Contractor's approval, and submit to Construction Manager, in accordance with the Submittal Schedule, with reasonable promptness and in orderly sequence so as to cause no delay in the Work or in the Work of any other Contractor, all Shop Drawings and samples required by the Contract Documents or subsequently by Architect as covered by modifications. Shop Drawings and samples shall be properly identified as specified, or as Architect may require. At the time of submission, Contractor shall inform Construction Manager and Architect, in writing, of any deviation in the Shop Drawings or samples

from the requirements of the Contract Documents.

11.02 Warranties concerning Shop Drawings and samples. By approving and submitting Shop Drawings and samples, Contractor thereby represents that Contractor has determined and verified all field measurements, field construction criteria, materials, catalog numbers, and similar data, or will do so, and that Contractor has checked and coordinated each Shop Drawing and sample with the requirements of the Work and of the Contract Documents.

11.03 Architect review and approval. Architect will review Shop Drawings and samples with reasonable promptness so as to cause no delay, but only for conformance with the design concept of the Project and with information given in the Contract Documents. Architect's approval of a separate item shall not indicate approval of an assembly in which the item functions.

11.04 Corrections. Contractor shall make any corrections required by Architect and shall resubmit the required number of corrected copies of Shop Drawings or new samples until approved. Contractor shall direct specific attention, in writing, or on resubmitted Shop Drawings, to revisions other than the corrections requested by Architect on previous submissions.

11.05 Contractor's responsibility. Architect's approval of Shop Drawings or samples shall not relieve Contractor of responsibility for any deviation at the time of submission, nor shall Architect's approval relieve Contractor from responsibility for errors or omission in the Shop Drawings or samples.

11.06 Completion of Work in accordance with Shop Drawings and samples. No portion of the Work requiring a Shop Drawing or sample submission shall be commenced until Architect has approved the submission. All such portions of the Work shall be in accordance with approved Shop Drawings and samples.

ARTICLE 12 SEPARATE CONTRACTS ON SAME PROJECT

12.01 County's right to award separate Contracts. County reserves the right to award other Contracts in connection with other portions of the Project.

12.02 Coordination among Contractors. Contractor shall ascertain to Contractor's own satisfaction the scope of the Project and the nature of any other Contracts that have been or may be awarded by County in prosecution of the Project, to the end that Contractor may perform this Contract in light of such other Contracts, if any. Nothing herein shall be interpreted as granting to Contractor exclusive occupancy at the Site. Contractor shall not cause any unnecessary hindrance or delay to any other Contractor working on the Project. If simultaneous execution of any Contract for the Project is likely to cause interference with the performance of some other Contract or Contracts, County shall decide which Contractor shall cease Work temporarily and which Contractor shall continue or whether Work can be coordinated so that Contractors may proceed simultaneously.

12.03 Responsibility to other Contractors. Contractor shall afford other Contractors on the same Project reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their Work, and shall properly connect and coordinate Contractor's Work with theirs.

12.04 Duty to inspect other Contractor's Work. If any part of Contractor's Work depends for proper execution or results upon the Work of any other separate Contractor, Contractor shall inspect and promptly report to Construction Manager any apparent discrepancies or defects in such Work that render

it unsuitable for such proper execution and results. Failure of Contractor to inspect and report shall constitute an acceptance of the other Contractor's Work as fit and proper, except as to defects which may develop in the other separate Contractor's Work after the execution of Contractor's Work. Any Work exhibiting unacceptable quality as defined by the Contract Documents will result in Contractor's payment (or a portion thereof) being withheld until the unacceptable Work is corrected to meet the required quality standards, per Article 19 herein.

12.05 Damage to other Contractor's Work. Should Contractor cause damage to the Work or property of any separate Contractor on the Project, Contractor shall, upon due notice, settle with such other contractor by Agreement or arbitration, if he/she/it will so settle. If such separate Contractor sues County or initiates an arbitration proceeding on account of any damage alleged to have been so sustained, County shall notify Contractor who shall defend such proceedings and indemnify and hold harmless County.

12.06 Responsibility for costs caused by one (1) Contractor to another. Any costs to one (1) Contractor or his/her/its Subcontractors on the Project caused by defective or ill-timed Work by another Contractor or his/her/its Subcontractors on the Project shall be borne by the party responsible for such defective or ill-timed Work.

12.07 County's right to settle disputes over cleanup. If a dispute arises between the separate contractors as to their responsibility for cleaning up under Section 16.08, County may clean up and charge the cost thereof to the several Contractors, as determined by County.

ARTICLE 13 TESTS

13.01 Contractor's responsibility for required tests. If Contract Documents, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction require any Work to be inspected, tested, or approved, Contractor shall give Construction Manager and Architect timely notice of its readiness and of the date arranged so Construction Manager and Architect may observe such inspection, testing, or approval. County shall bear all costs of such inspections, tests, and approval, unless otherwise provided.

13.02 Responsibility for tests not anticipated in Contract. If after the commencement of the Work, Construction Manager, Architect, or County determines that any Work requires special inspection, testing, or approval which Section 13.01 does not include, he/she will, upon written authorization from County provided through the Construction Manager and Architect, instruct Contractor to order such special inspection, testing, or approval, and Contractor shall give notice as in Section 13.01. If such special inspection or testing reveals a failure of the Work to comply (1) with the requirements of the Contract Documents or (2) with laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction, then Contractor shall bear all costs thereof, including Construction Manager's and Architect's additional services made necessary by such failure; otherwise County shall bear such costs, and an appropriate Change Order shall be issued.

13.03 Certificates of inspection. Required certificates of inspection, testing, or approval shall be secured by Contractor and promptly delivered by Contractor to Construction Manager for transmittal to Architect.

13.04 Observation by Construction Manager. If Construction Manager or Architect wishes to observe the inspections, tests, or approvals required by this Article 13, the Construction Manager or Architect will do so promptly and, where practicable, at the source of supply.

13.05 No waiver of Contractor's responsibility. Neither the observations of Construction Manager or Architect in administration of the construction Contract, nor inspections, tests, or approvals by persons other than Contractor shall relieve Contractor from Contractor's obligations to perform the Work in accordance with the Contract Documents.

ARTICLE 14 - CONTRACTOR'S PROSECUTION AND PROGRESS OF THE WORK

14.01 Contractor To Supervise The Work

- A. Subject to those rights specifically reserved in the Contract Documents, Contractor shall supervise, direct, have control over, and be responsible for, Contractor's means, methods, techniques, sequences or procedures of construction, safety precautions and programs incident thereto, and compliance with laws and regulations applicable to the furnishing or performance of Work.
- B. Contractor shall keep on the Site at all times during Work progress a competent resident Superintendent, who shall not be replaced without Owner's express written consent. The Superintendent shall be Contractor's representative at the Site and shall have complete authority to act on behalf of Contractor. All communications to and from the Superintendent shall be as binding as if given to or by Contractor.
- C. Contractor shall supervise, inspect, and direct Work competently and efficiently, devoting the attention and applying such personal skills and expertise as may be required and necessary to perform Work in accordance with Contract Documents. Contractor shall be solely responsible for and have control and charge of construction means, methods, techniques, sequences and procedures, safety precautions and programs in connection with the Work. Contractor shall be responsible to see that the completed Work complies accurately with Contract Documents.
- D. Contractor is fully responsible for Contractor's own acts and omissions. Contractor is responsible for all acts and omissions of its Subcontractors, suppliers, and other persons and organizations performing or furnishing any of the Work, labor, materials, or equipment under a direct or indirect Contract with Contractor.
- E. Contractor shall conduct monthly Contractor Safety Committee meetings, and weekly toolbox safety talks unless directed otherwise in Contract Documents.

14.02 Contractor To Maintain Cost Data

- A. Contractor shall maintain full and correct information as to the number of workers employed in connection with each subdivision of Work, the classification and rate of pay of each worker in form of certified payrolls, the cost to Contractor of each class of materials, tools and appliances used by Contractor in Work, and the amount of each class of materials used in each subdivision of Work. Contractor shall provide Owner with monthly summaries of this information. If Contractor maintains or is capable of generating summaries or reports comparing actual Project costs with Bid estimates or budgets, Contractor shall provide Owner with a copy of such report upon Owner's request.
- B. Contractor shall maintain daily job reports recording all significant activity on the job, including the number of workers on-site, Work activities, problems encountered and delays. Contractor shall provide Construction Manager with copies for each Day Contractor works on the Project, to be delivered to Construction Manager either the same Day or the following morning before starting Work at the Site. Contractor shall take pre-construction and monthly progress photographs of all areas of the Work. Contractor shall maintain copies of all correspondence with Subcontractors and records of meetings with Subcontractors.
- C. Owner shall have the right to audit and copy Contractor's books and records of any type, nature or description relating to the Project (including but not limited to financial records reflecting in any way costs claimed on the Project), and to inspect the Site, including Contractor's trailer, or other job

Site office, and this requirement shall be contained in the Subcontracts of Subcontractors working on-site. By way of example, Owner shall have the right to inspect and obtain copies of all Contract Documents, planning documents, Bid proposal and negotiation documents, cost records and job cost variance reports, value engineering or other cost reduction proposals, job progress reports, photographs, and as-built Drawings maintained by Contractor. Owner and any other applicable governmental entity shall have the right to inspect and audit all information and documents maintained hereunder at any time during the Project and for the longest period of time provided in Article 36 of this Division 007100. These rights of audit and inspection shall not relieve Contractor of its duties and obligations under the Contract Documents. These rights of audit and inspection shall be specifically enforceable in a court of law, either independently or in conjunction with enforcement of any other rights in the Contract Documents.

14.03 Contractor To Supply Sufficient Workers And Materials

A. Unless otherwise required by Owner under the terms of Contract Documents, Contractor shall at all times keep on the Site materials and employ qualified workers sufficient to prosecute Work at a rate and in a sequence and manner necessary to complete Work within the Contract Time. This obligation shall remain in full force and effect notwithstanding disputes or Claims of any type.

B. At any time during progress of Work should Contractor directly or indirectly (through Subcontractors) refuse, neglect, or be unable to supply sufficient materials or employ qualified workers to prosecute the Work as required, then Owner may require Contractor to accelerate the Work and/or furnish additional qualified workers or materials as Owner may consider necessary, at no cost to Owner. If Contractor does not comply with the notice within three (3) Business Days of date of service thereof, Owner shall have the right (but not a duty) to provide materials and qualified workers to finish the Work or any affected portion of Work, as Owner may elect. Owner may, at its discretion, exclude Contractor from the Site, or portions of the Site or separate Work elements during the time period that Owner exercises this right. Owner will deduct from moneys due or which may thereafter become due under the Contract Documents, the sums necessary to meet expenses thereby incurred and paid to persons supplying materials and doing Work. Owner will deduct from funds or appropriations set aside for purposes of Contract Documents the amount of such payments and charge them to Contractor as if paid to Contractor. Contractor shall remain liable for resulting delay, including liquidated damages and indemnification of Owner from Claims of others.

C. Exercise by Owner of the rights conferred upon Owner in this subparagraph is entirely discretionary on the part of Owner. Owner shall have no duty or obligation to exercise the rights referred to in this subparagraph and its failure to exercise such rights shall not be deemed an approval of existing Work progress or a waiver or limitation of Owner's right to exercise such rights in other concurrent or future similar circumstances. (The rights conferred upon Owner under this subparagraph are, like all other such rights, cumulative to Owner's other rights under any provision of the Contract Documents.)

14.04 Contractor To Maintain Project Record Documents

A. Contractor shall maintain in a safe place at the Site one (1) record copy of all Drawings, Specifications, Addenda, Contract Modifications, Works, Work Directives, Force Account orders, and written interpretations and clarifications in good order and annotated to show all as-built changes made during construction. These Project Record Documents, together with all approved samples and a counterpart of all approved Shop Drawings, shall be maintained and available to Owner through Construction Manager for reference. Upon completion of the Work, Contractor shall deliver to Owner through Construction Manager, the Project Record Documents, samples and Shop Drawings and as-built Drawings.

B. Throughout Contractor's performance of the Work of the Project, Contractor shall maintain

construction records to include: Shop Drawings; product data/material data sheets; samples; submittal; purchases; materials; equipment; inspections; applicable handbooks; applicable codes and standards; maintenance and operating manuals and instructions; RFI Log; Submittal Log; other related documents and revisions which arise out of the Construction Contracts. Contractor shall maintain records of principal building layout lines, elevations for the bottom of footings, floor levels, and key Site elevations (certified by a qualified surveyor or professional engineer). Contractor shall make all records available to Owner through Construction Manager. At the completion of the Project, Contractor shall deliver all such records to the Owner through Construction Manager to have a complete set of record as-built Drawings.

14.05 Contractor To Not Disrupt Owner Operation

A. Contractor shall schedule and execute all Work in a manner that does not interfere with or disrupt Owner operations, including but not limited to, parking, utilities (electricity, gas, water), noise, access by employees and administration, access by vendors, and any other person or entity using Owner facilities or doing business with Owner. Contractor shall produce and supply coordination Plans and requests to Owner through Construction Manager, following Construction Manager's procedures, for all necessary interference of construction with Owner, which Owner will reasonably cooperate with.

ARTICLE 15 TIME FOR PERFORMANCE AND LIQUIDATED DAMAGES

15.01 Time is of the essence. All time limits stated in the Contract Documents are of the essence of the Contract.

15.02 Commencement and completion of Work. Contractor shall commence the Work on the starting date established in the Notice to Proceed and shall complete the Work thereafter within the time limit established in the Project Schedule as defined in Supplementary Conditions, Section 1. If there is no Notice to Proceed, Contractor shall commence the Work on the starting date established in the Supplementary Conditions and shall complete the Work thereafter within the time limit established in the Supplementary Conditions. If there is no Notice to Proceed and if the Supplementary Conditions do not establish a starting or completion date, Contractor shall commence the Work promptly after the Agreement is executed by all parties and shall prosecute the Work regularly and diligently so as to complete the Work within a reasonable time thereafter.

15.03 Prosecution of Work. Contractor shall prosecute the Work diligently and expeditiously with adequate forces and shall complete it within the time specified in the Contract Documents.

15.04 Date of final completion. When Contractor believes that Contractor's Work is completed, he/she/it shall request that Architect and Construction Manager inspect the Work and certify its completion. Architect and Construction Manager will respond promptly to such a request. The date of final completion of the Work or any designated portion thereof is the date on which, after Architect and Construction Manager certify that construction has been completed in accordance with the Contract Documents, the County Board of Supervisors accepts the Work.

15.05 Grounds for extension of time. The time for completion of the Work shall be extended by Change Order for such reasonable time as Construction Manager or County may determine, if an extension of time is reasonably necessary due to a delay caused to Contractor by any of the following circumstances:

(a) Sole act or sole negligence of County, Architect, Construction Manager, any employee of either, or

any separate Contractor employed by County;

(b) Any change ordered in the Work, which change is requested by County or Architect or which is not due to the act or negligence of Contractor.

(c) Any labor disputes, fire, unusual delay in transportation, unavoidable casualties, or causes beyond Contractor's control and which Contractor could not reasonably have foreseen or made reasonable provisions for, and which are not caused by or the continuance of which is not due to, any act or failure to act on behalf of Contractor; or

(d) Any other cause which Architect or Construction Manager determines may justify the delay.

15.06 Extensions of time due to failure to furnish interpretation. No extension of time shall be allowed for delay caused by Architect's failure to promptly provide an interpretation of the Contract, except in the following circumstances:

(a) Architect failed to provide the interpretation for over fifteen days after demand was made for such interpretation, and it would be reasonable to extend time due to such failure; or

(b) The parties have agreed upon a schedule for the provision of interpretations, Architect failed to comply within that schedule, and it would be reasonable to extend time due to such failure.

15.07 Inexcusable Delay. Contract Time shall not be extended for any period of time where Contractor (and/or any Subcontractor) is delayed or prevented from completing any part of the Work due to a cause that is within Contractor's risk or responsibility under the Contract Documents. Delays attributable to or within the control of a Subcontractor, or its Subcontractors, or supplier, are deemed delays within the control of Contractor.

15.08 Claims for extension of time. Notwithstanding the provisions of Section 15.05 and 15.06 above, none of the causes of delay described therein shall be deemed a valid excuse for Contractor's failure to start, perform, or complete the Work, or any portion thereof, on time unless Contractor has notified Construction Manager, in writing, of the alleged cause of delay within ten (10) days after commencement of the cause of the delay. Should Construction Manager and County disagree with Contractor that the alleged delay warrants an extension of time for the performance of any act required hereunder, Contractor shall notify Construction Manager, in writing, as provided in Article 33; provided that Contractor shall proceed with the Work during the period that Construction Manager and Contractor seek to resolve the matter.

15.09 Compensable Time Extensions

A. Subject to other applicable provisions of the Contract Documents, Contractor may be entitled to adjustment in Contract Sum in addition to Contract Time for:

1. Excusable delay caused solely by Changes in the Work ordered by Owner, as provided above, and/or

2. Excusable delay caused solely by Acts or Neglect by Owner or other person, as provided above.

15.10 Non-Compensable Time Extensions

A. Subject to other applicable provisions of the Contract Documents, Contractor may be entitled to adjustment in Contract Time only, without adjustment in Contract Sum, for

1. Periods of excusable delay caused solely by weather or Force Majeure events as provided above in this Article, or

2. Periods of concurrent delay, where delay results from two (2) or more causes, one of which is compensable (resulting from Changes or Acts or Neglect as set forth above in this Article), and the other of which is non-compensable or unexcusable, such as: acts or neglect of Contractor, Subcontractors or others for whom Contractor is responsible; other acts, omissions and conditions

which would not entitle Contractor to adjustment in Contract Time; adverse weather; and/or actions of Force Majeure as provided above in this Article.

15.11 Liquidated damages.

THE PARTIES AGREE THAT IN THE EVENT THAT ALL WORK CALLED FOR UNDER THE CONTRACT IN ALL PARTS AND REQUIREMENTS IS NOT COMPLETED WITHIN THE TIME SPECIFIED IN THE CONTRACT DOCUMENTS, DAMAGE WILL BE SUSTAINED BY COUNTY, AND THAT IT IS AND WILL BE IMPRACTICABLE AND EXTREMELY DIFFICULT TO DETERMINE THE ACTUAL DAMAGE WHICH COUNTY WILL THEREBY SUSTAIN. THE PARTIES THEREFORE AGREE THAT CONTRACTOR WILL PAY TO COUNTY THE SUM SET FORTH IN THE SUPPLEMENTARY CONDITIONS, IF ANY, FOR EACH CALENDAR DAY OF DELAY UNTIL THE WORK IS COMPLETED AND ACCEPTED. CONTRACTOR AND CONTRACTOR'S SURETY SHALL BE LIABLE FOR THE TOTAL AMOUNT THEREOF. CONTRACTOR AGREES TO PAY SAID LIQUIDATED DAMAGES ESTABLISHED HEREIN, AND FURTHER AGREES THAT COUNTY MAY DEDUCT THE AMOUNT THEREOF FROM ANY MONIES DUE OR THAT MAY BECOME DUE CONTRACTOR UNDER THE CONTRACT.

15.12 Removal or relocation of main or trunk line utility facilities. Contractor shall not be assessed for liquidated damages for delay in completion of the Project, when such delay was caused by the failure of County or a utility company to provide for removal or relocation of existing main or trunk line utility facilities. However, when Contractor is aware that removal or relocation of an existing utility has not been arranged, Contractor shall promptly notify County and the utility company, in writing, so that provision for such removal or relocation may be made to avoid and minimize any delay which might be caused by the failure to remove or relocate the main or trunk line utility facilities, or to provide for their removal or relocation. In accordance with Government Code Section 4215, if Contractor while performing the Contract discovers any existing main or trunk line utility facilities not identified by County in the Contract Plans or Specifications, Contractor shall immediately notify Construction Manager and utility in writing. The utility, where it is the owner of the facilities, shall have the sole discretion to perform repairs or relocation Work or permit Contractor to do such repairs or relocation Work at a reasonable price. Contractor shall be compensated for the costs of locating, repairing damage not due to the failure of Contractor to exercise reasonable care, and removing or relocating such utility facilities not indicated in the Plans and Specifications with reasonable accuracy and for equipment on the Project necessarily idled during such Work. Such compensation shall be in accordance with the extra Work provisions set forth elsewhere in the Contract Documents. Conversely, Contractor shall not be compensated for the costs of locating, repairing damage, and removing or relocating such utility facilities which is due to the failure of Contractor to exercise reasonable care. In such an event, Contractor shall not be credited for nor given an extension of time for equipment on the project necessarily idled during such Work necessitated by Contractor's failure to exercise reasonable care.

15.13 Partial Occupancy or Use. The County may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate Agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the County, Construction Manager, and Contractor have accepted, in writing, the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to the Work, and insurance, and have agreed, in writing, concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor and Construction Manager shall jointly prepare and submit a list to the Architect.

Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of progress of the Work shall be determined by written Agreement between the County and Contractor or, if no Agreement is reached, by decision of the Architect after consultation with the Construction Manager. Immediately prior to such partial occupancy or use, the County, Construction Manager, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work. Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

ARTICLE 16 USE OF SITE

16.01 Limit of operations. Contractor shall confine his/her/its apparatus, the storage of materials, and the operations of his/her/its workers to limits indicated on the Plans, or by law, ordinances, permits, or directions of Construction Manager and shall not unreasonably occupy the premises with his/her/its materials. Insofar as possible, Contractor shall arrange his/her/its Work and its progress to prevent any interference with the operations of the existing facilities. All utilities must be protected and connections made to utilities so as not to interrupt service.

16.02 Contractor's Use Of The Site. Contractor shall not make any arrangements with any person to permit occupancy or use of any land, structure or building within the limits of the Work, for any purpose whatsoever, either with or without compensation, in conflict with any Agreement between Owner and any Owner, former Owner or tenant of such land, structure or buildings. Contractor may not occupy Owner owned property outside the limit of the Work as indicated on the Drawings unless it obtains prior approval from Owner.

16.03 Utilities. Unless otherwise noted, all utilities, including, but not limited to, electricity, water, gas, and telephone, used on the Work shall be furnished and paid for by Contractor. Contractor shall furnish and install temporary distribution systems, including meters, if necessary, from distribution points to points on-site where utility is necessary to carry on the Work. Upon completion of the Work, Contractor shall remove all temporary distribution systems. If this Contract is for an addition to an existing facility, Contractor may, with the written permission of County, use County's existing utilities by making prearranged payments to County for utilities used by Contractor for construction.

16.04 Metering devices. For the purpose of providing utility service to the Project, Contractor may install or cause to be installed metering devices or other equipment of utility companies or of political subdivisions, title to which is commonly retained by the utility company or political subdivision. If any such metering device or equipment is installed, Contractor shall advise County as to the owner of such device or equipment.

16.05 Sanitary facilities. Contractor shall provide sanitary toilet facilities for the use of all workers and Subcontractors. The building shall be properly stocked and maintained in a sanitary condition at all times and shall be left at the Site until removal is directed by Construction Manager. Use of the toilet facilities in the Work under construction shall not be permitted.

16.06 Field office. ***If box is checked, requirement is deleted for this Project.***
Contractor shall provide for the exclusive use of Architect and County a temporary, private office of not less than 150 square feet of floor area to be located as directed by County and to be maintained until removal is authorized by County. The office shall be of substantial waterproof construction with adequate natural light and ventilation by means of stock-design windows. The door shall have a key-

type lock or padlock hasp. A table satisfactory for study of Plans and two (2) chairs shall be provided by Contractor. Contractor shall provide and pay for adequate lights, heat, and air conditioning for the field office until authorized removal. See Specification Section 015000.

16.07 Telephone/Internet Access. ***If box is checked, requirement is deleted for this Project.*** Contractor shall install a working telephone and provide internet access in Architect and County's office and shall maintain the same until the final completion of the Contract and the acceptance of Work. Architect and County shall have free, unrestricted use of this telephone and internet access for purposes connected with the Work. The cost of the installation and all charges for the use of the telephone and internet access shall be paid by Contractor.

16.08 Cleaning up during and after Work. Contractor, at all times, shall keep the premises free from accumulation of waste materials or rubbish caused by his/her/its operations. At the completion of the Work, Contractor shall remove all Contractor's waste materials and rubbish from and about the Project as well as all Contractor's tools, construction equipment, machinery, and surplus materials. If Contractor fails to clean up, County may do so and the cost thereof shall be charged to Contractor as provided in Section 34.03.

ARTICLE 17 MATERIALS

17.01 Quality of materials. Unless otherwise specified, all materials shall be new and both workmanship and materials shall be of good quality. If required by the Construction Manager or Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

17.02 Provision and storage of materials. Materials shall be furnished in ample quantities and at such times as to ensure uninterrupted progress of Work and shall be stored properly and protected as required. Contractor shall be entirely responsible for damage or loss by weather or other causes to materials or Work under this Contract. All stored items shall be inventoried, specified by identification numbers (if applicable), released to County by sureties of Contractor, and, if stored offsite, stored only in a reputable bonded warehouse.

17.03 Substitution of materials. Whenever in the Specifications any materials, process, or article is indicated or specified by grade, patent, or proprietary name or by the name of the manufacturer, such specification shall be deemed to be used for the purpose of facilitating the description of the material, process, or article desired and shall be deemed to be followed by the words "or equal," and Contractor may, unless otherwise stated, offer any material, process, or article which shall in every respect be substantially equal to or better than that specified only with the consent of County, after evaluation by Architect, in consultation with Construction Manager, and in accordance with a Change Order or Construction Change Directive. The burden of proof as to equality of any material, process, or article shall rest with Contractor. Contractor shall submit any request for substitution, together with any substantiating data, within thirty-five (35) days after the award of this Contract. These provisions authorizing submission of "or equal" justification data shall not in any way authorize an extension of time for performance of this Contract. In the event Contractor furnished material, processes, or articles are more expensive than those specified, the difference in cost so furnished shall be borne by Contractor. Requests for substitution of products, materials, or processes other than those specified must be accompanied by evidence whether or not the proposed substitution: (1) is equal in quality and serviceability to the specified item; (2) will entail changes in detail and construction of related Work; (3) will be acceptable in consideration of the required design and artistic effect; (4) will not provide a

cost disadvantage to Architect or County. Contractor shall promptly provide, upon request, any other information that may be required of it to assist Architect, Construction Manager, and County in determining whether the proposed substitution is acceptable. The final decision shall be that of Architect in consultation with Construction Manager and County. County's and Architect's approval shall be in writing, shall follow the procedure for Change Orders, and shall be required for the use of a proposed substitute material. County may condition its approval of the substitution upon delivery to County of an extended warranty or other assurances of adequate performance of the substitution.

ARTICLE 18 CHANGES IN THE WORK

18.01 Change Orders.

A. County, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions. The Contract Sum and the Time for performance of the Work shall be adjusted accordingly. All such changes in the Work shall be authorized by Change Order, and shall be executed under the applicable conditions of the Contract Documents. The Contract Sum and the Time for performance of the Work may be changed only by Change Order.

B. The amount to be paid to Contractor pursuant to the Contract Documents shall, where applicable, be increased or decreased in the manner hereinafter set forth; provided however, that if Contractor should proceed with a Change in the Work upon an oral order, by whomsoever given, it shall constitute a waiver by Contractor of any Claim for an increase in the Contract Sum on account thereof. Upon receipt of said written Change Order or Written Directive, Contractor shall promptly proceed with the Change in the Work, even though the amount of any resultant increase or decrease in the Contract Sum has not yet been determined. All Changes in the Work shall be performed in accordance with the Contract Documents.

18.02 Method to calculate adjustments in Contract Sum. Determination of the method to be used to calculate adjustments in the Contract Sum shall be at the sole discretion of County. The use by Contractor of the Total Cost Method (calculating the total sum of expenses incurred on the Project, less amounts paid, marked up by overhead and profit) of pricing changes and Claims is expressly prohibited (provided however, County may use a "make whole" analysis to determine the reasonableness of Contractor's Claim). One (1) of the following methods shall be used:

A. Unit Price Method:

1. Whenever County or its representative authorizes Contractor to perform on a Unit Price basis, County's authorization shall clearly state the:
 - a. Scope of Work to be performed;
 - b. Applicable Unit Price; and
 - c. Not to exceed amount of reimbursement as established by County.
2. The applicable Unit Price shall include reimbursement for all direct and indirect costs of the Work, including overhead and profit.
3. Contractor shall only be paid under this method for the actual quantity of materials incorporated in or removed from the Work and such quantities must be supported by field measurement statements verified by County.

B. Firm Fixed Price Method:

1. Contractor and County may mutually agree on a fixed amount as the total compensation for the

performance of changed Work.

2. Any adjustments to the Contract Sum using the Firm Fixed Price Method shall include: all reasonable costs for labor (hours and rates), equipment, materials, overhead, and profit. Such overhead and profit shall be calculated in accordance with provision 18.04(B)(4)f.

3. Whenever County authorizes Contractor to perform changed Work on a Firm Fixed Price Method, County's authorization shall clearly state:

- a. Scope of Work to be performed.
- b. Total Fixed Price payment for performing such Work.

C. Time and Materials Method:

1. Whenever County authorizes Contractor to perform Work on a Time and Material basis, County's authorization shall clearly state:

- a. Scope of Work to be performed;
- b. A not to exceed amount of reimbursement as established by County.

2. Contractor shall:

- a. Cooperate with County and assist in monitoring the Work being performed;
- b. Contractor's and Subcontractors' labor hours, materials, and equipment charged to Work under the Time and Materials Method shall be substantiated by detailed time cards or logs completed on a daily basis before the close of business each Work day. Contractor shall initial each time card and/or log at the close of each Work day. Records of Contractor and Subcontractors pertaining to Work paid for on a Time and Materials method shall be maintained and available for inspection as requested by County or its representatives;
- c. Perform all Work in accordance with this provision as efficiently as possible; and
- d. Not exceed any cost limit(s) without County's prior written approval.

3. Contractor shall submit costs and any additional information requested by County to support Contractor's requested Contract Sum adjustment.

D. No change in the Contract Sum shall be allowed to the extent (1) Contractor's changed cost of performance is due to the fault, acts, or omissions of Contractor, or anyone for whose acts or omissions Contractor is responsible; (2) the change is concurrently caused by Contractor and County; or (3) the change is caused by an act of *Force Majeure*.

E. County shall not be responsible for, and Contractor shall not be entitled to, unallowable costs. Unallowable costs include, but are not limited to, (1) interest or attorney's fees of any type other than those mandated by California statutes, (2) Claim preparation or filing costs, (3) the cost of preparing or reviewing Change Proposals or Requests for Change Orders, (4) lost profits, lost income or earnings, (5) rescheduling costs, (6) costs for idle equipment when such equipment is not at the Site, has not been employed in the Work and is not scheduled to be used at the Site, (7) lost earnings or interest on unpaid retention, (8) Claims consulting costs, (9) the costs of corporate officers or staff visiting the Site or participating in meetings with County, (10) any compensation due to the fluctuation of foreign currency conversions or exchange rates, (11) loss of other business, and (12) any other special, consequential, or incidental damages incurred by Contractor or Subcontractors.

18.03 Signatures on Change Orders. A Change Order shall be in writing and shall be signed by County, Construction Manager, Contractor, and Architect. Alternatively, the Change Order may be signed by Architect alone, provided Architect has written authority from County for such procedure and that a copy of such written authority is furnished to Contractor if Contractor agrees to the adjustment in the Contract Sum or the Contract Time. Except as otherwise provided herein, the Change Order shall also be signed by Contractor in order to be effective, indicating Contractor's

consent to the changes made.

18.04 Determining cost or credit for Change Order.

A. The cost or credit to County resulting from a Change in the Work shall be determined in one (1) or more of the following ways:

1. by mutual acceptance of a lump sum for Work and materials properly itemized;
2. by Unit Prices stated in the Contract Documents or subsequently agreed upon; or
3. as provided in Subsection 18.04(B).

B. All parties to the Agreement shall observe the following procedures for all Change Proposals and shall require all Subcontractors to follow the same procedures:

1. Each Change Proposal will carry a unique identifying number, such as C-001, A-001 or O-001 which identifies the originator, i.e. C = Contractor, A = Architect, O = Owner and a chronological serial number. All correspondence referring to that Change Order, no matter who originates the correspondence, shall refer to the same identifying number. Any Change Proposal without such number shall be returned to the originator.
2. The items of Work involved shall be identified by specific reference to Drawing and detail number and Specification Section if possible.
3. The quantities of material or other Work involved will be identified along with the costs thereof. The items of Work shall be arrayed in a manner that is consistent with the Construction Specifications Institute (CSI) forty-eight (48) division uniform system for classifying construction activities used for the schedule of values for each Project component.
4. The total cost of a Change Proposal shall be limited to the following elements of cost, overhead, and profit:
 - a. Labor - For all labor, including foreman supervision, but excluding general superintendents, as may be necessary, Contractor shall be reimbursed for labor costs as provided herein. The labor cost of a change in the Work shall be calculated as the sum of the following.
 - i. Wages of labor on Contractor's payroll, including foreman, directly engaged in the Work; hourly rates for each classification of worker shall be identified;
 - ii. Engineering and drafting performed;
 - iii. Fringe benefits established by the governing trade organizations;
 - iv. Federal Insurance Contributions Act costs and Federal and State Unemployment Taxes;
 - v. Net actual premium change for Commercial Liability, Workers' Compensation, Property Damage, and any other forms of Insurance.
 - b. Materials – The cost of materials resulting from a change in the Work shall be calculated in one (1) or more of the following methods, at County's election:
 - i. Invoice Cost – Contractor may be paid the actual invoice cost of materials including actual freight and express charges and applicable taxes less all available discounts, rebates, and back charges, notwithstanding the fact that available discounts, rebates and back charges may not have been provided to Contractor. This method shall be considered only to the extent Contractor's invoice costs are reasonable and Contractor provides copies of vendor invoices, freight and express bills, and other evidence of cost accounting and payment satisfactory to County. As to materials furnished from Contractor's stocks for which an invoice is not available, Contractor shall furnish an affidavit certifying its actual cost of such materials and such other information as County may reasonably require;
 - ii. Wholesale Price - Contractor may be paid the lowest current wholesale price for which the materials are available in the quantities required, including customary costs of delivery and all applicable taxes less all available discounts, rebates, and back charges; or,
 - iii. County-Furnished Materials - County reserves the right to furnish such materials as it deems

- advisable; Contractor shall have no Claim for costs, overhead, or profit on such materials.
- c. Equipment – The additional cost, if any, of machine-power tools and equipment usage shall be calculated in accordance with the following:
- i. Equipment Rates - Contractor's own charge rates may be used if verified and approved by County and based on Contractor's actual ownership and operating cost experience. Rental rates contained in published rate guides may be used if their cost formulas and rate factors are identifiable, reflect Contractor's historical acquisition cost, utilization, and useful life, and do not include replacement cost, escalation contingency reserves, general and administrative expense, or profit. Rates shall be based on Contractor's actual allowable costs incurred or the rates established according to the Rental Rate Blue Book for Construction Equipment, published by Machinery Information Division of PRIMEDIA, whichever is less. The Rental Rate Blue Book established rate shall be the monthly rate for the equipment plus the monthly rate for required attachments, divided by one hundred and seventy-six (176), plus the hourly operating cost, multiplied by the appropriate area adjustment factor if appropriate. The rates shall apply for actual equipment usage up to eight (8) hours per day. For all hours in excess of eight (8) hours per day or one hundred and seventy-six (176) hours per month, the established monthly rate shall be divided by three hundred and fifty-two (352), plus the hourly operating cost, multiplied by the area adjustment factor, if appropriate.
 - ii. Transportation - If necessary equipment is not already at the Site and it is not anticipated that it would be required for the performance of other Work under the terms of the Contract, the calculation shall include a reasonable amount for the costs of the necessary transportation of such equipment.
 - iii. Standby - Contractor shall only be entitled to standby equipment costs if (a) the equipment is ready, able, and available to do the Work at a moment's notice; (b) Contractor is required to have equipment standby because of an event or condition solely caused by County; and (c) Contractor can demonstrate that it could have and intended to use the equipment on other Projects or jobs. Contractor shall be compensated at fifty percent (50%) of the adjusted hourly rate identified in the Rental Rate Blue Book for Construction Equipment, published by Machinery Information Division of K-111 Directory Corp. Standby shall not be paid during periods of Contractor caused delay, concurrent delay, unusually severe weather conditions, during any seasonal shutdown, routine maintenance, downtime, or occurrence specified in the Contract Documents. No payment shall be made for a twenty-four (24) hour period. Standby costs shall not be paid for weekends, holidays, and any time the equipment was not intended to be used on the Project as demonstrated by the Project Schedule.
- d. Subcontractor's Cost - The Subcontractor's cost of Work shall be calculated and itemized in the same manner as prescribed herein for Contractor.
- e. Bonds - Itemized statement of changes in costs of Bonds.
- f. Markup - Allowed markup for Change Order Work shall not exceed the following two (2) items:
- i. ten percent (10%) combined overhead and profit markup for Contractor performing the actual Change Order Work and,
 - ii. five percent (5%) combined overhead and profit markup on the direct costs for Contractor's markup of Subcontractor Work. In no event shall the total combined overhead and profit markup for Contractor and all intermediate tier Subcontractors and suppliers exceed fifteen percent (15%) of the direct cost to perform the Change Order Work. Direct costs shall include Labor (as defined in provision 18.04(B)(4)a, Materials (as defined in provision 18.04(B)(4)b, Equipment (as defined in provision 18.04(B)(4)c, Subcontractor Costs (as defined in provision 18.04(B)(4)d, Bond (as defined in provision 18.04(B)(4)e. All other costs shall be deemed overhead costs. Profit markup shall be allowed on delay, acceleration, unabsorbed overhead, or any other asserted impact costs.

g. Taxes - Taxes required to be paid by Contractor, but not included above.

C. Invoices or quotes shall accompany Change Proposals from vendors. Change Proposals shall be sent to Architect and Construction Manager, in duplicate, who shall maintain a database of all proposals which can readily determine the location and status of the change request. Change Proposals shall include all cost backup, including breakdown of hours expended by jobsite personnel per task with or without overall execution of the Work. Lump sum Change Proposals lacking necessary backup, as determined by County, will not be accepted or approved.

D. All Change Proposals shall be checked by Architect and Construction Manager for accuracy and fairness. Should Contractor utilize Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) or National Electrical Contractors Association (NECA) cost estimating standards, they will use seventy percent (70%) of the most favorable labor productivity rates.

E. When the final costs are agreed upon by County, Construction Manager, Contractor, and Architect, a Change Order will be prepared by County for signature by County, Construction Manager, Contractor, and Architect. The Change Order shall be the record document defining the costs and time extensions, if any, of the required and agreed-to change in the Work. A Change Order calculated in accordance with the provisions of this Agreement shall be full and complete compensation and final settlement of all changes and Claims for all (a) time; (b) direct, indirect, and overhead costs; (c) profit; and (d) any and all costs or damages associated with delay, inconvenience, disruption of schedule, impact, ripple effect, loss of efficiency or productivity, acceleration of Work, lost profits, and/or any other costs or damages related to any Work either covered or affected by the changed Work, or related to the events giving rise to the change.

F. Contractor shall keep present, in the American Institute of Architects' format, an itemized accounting together with appropriate supporting data. Pending final determination of cost to County, payments on account shall be made on Contractor's certificate for payment. The amount of credit to be allowed by Contractor to County for any deletion or change which results in a net decrease in cost will be the amount of the actual net decrease as confirmed by Architect and Construction Manager. When both additions and credits are involved in any one (1) change, the allowance for overhead and profit shall be figured on the basis of net increase, if any.

G. If no Agreement can be reached on changes in the Work or costs, or Contractor refuses to accept a Change Order, County may issue the Change Order unilaterally. Contractor shall comply with the requirements of the Change Order. County shall provide for an equitable adjustment to the Contract Sum and compensate Contractor accordingly. If Contractor does not agree that the adjustment is equitable, it may submit a Claim in accordance with Article 33. If Contractor refuses to comply with the Change Order, County may have the Work done by another Contractor or its own forces.

18.05 Changes requiring an increase in Contract Sum.

A. If County elects to have the Change in the Work performed on a lump sum basis, its election shall be based on a lump sum proposal which shall be submitted by Contractor to County within five (5) Work days of County's request. County's request for a lump sum proposal shall not be deemed an election by County to have the Change in the Work performed on a lump sum basis.

B. If County elects to have the Change in the Work performed on a unit cost basis, its election shall be based on a Unit Price proposal which shall be submitted by Contractor to County within five (5) Work days of County's request. County's request for a Unit Price proposal shall not be deemed an election by

County to have Change in the Work performed on a Unit Price basis.

C. If County elects to have the Change in the Work performed on a time and materials basis, the same shall be performed, its election shall be based on a time and materials price proposal which shall be submitted by Contractor within five (5) Work days of County's request. County's request for a time and materials price proposal shall not be deemed an election by County to have the Change in the Work performed on a time and materials basis.

D. Nothing herein contained shall preclude County from requesting a lump sum proposal, a Unit Price proposal, and a time and materials price proposal, or any two (2) of those, with respect to the same Change in the Work, in which event, Contractor shall submit all proposals requested.

E. Until such time as County makes its election under this Section, Contractor shall submit daily time and materials tickets to County as required under subparagraph (C) and Section 18.04(B), which shall be subject to authentication as therein provided. At such time as County makes its election under this Section, an appropriate Change Order will be issued; provided however, that until such time, County shall pay to Contractor up to County's reasonable estimated value of the Change in the Work.

F. Contractor's proposal shall be in compliance with Sections 18.02, 18.03, and 18.04 of the General Conditions.

18.06 Changes requiring a decrease in Contract Sum. If the Change in the Work will result in a decrease in the Contract Sum, County may request a quotation by Contractor of the amount of such decrease for use in preparing a Change Order. Contractor's quotation shall be forwarded to County within five (5) days of County's request and, if acceptable to County, shall be incorporated in the Change Order. If not acceptable, the parties shall make every reasonable effort to agree as to the amount of such decrease, which may be based on a lump sum properly itemized, on Unit Prices stated in the Contract Documents and/or on such other basis as the parties may mutually determine. If the parties are unable to so agree, the amount of such decrease shall be the total of the estimated reduction in actual cost of the Work, as determined by County in its reasonable judgment, plus ten percent (10%) thereof as overhead and profit. Contractor's proposal shall be in compliance with Sections 18.02, 18.03, and 18.04 of the General Conditions.

18.07 Changes affecting Contract Time. If Change in the Work will result in an extension or contraction of the Contract Time, and the parties are unable to agree as to number of days by which the Contract Time will be extended or contracted, County shall not be required to make its determination until the Work has been completed, at which time its determination shall be based on a review of Contractor's books and records relating to the time involved in performing the Change in the Work and on County's judgment as to whether Contractor diligently performed the same.

18.08 Disputes regarding changes. If any dispute should arise between the parties with respect to an increase or decrease in the Contract Sum or an expansion or contraction in the Contract Time as a result of a Change in the Work, Contractor shall not suspend performance of a Change in the Work or the Work itself unless otherwise so ordered by County in writing. County shall, however, pay to Contractor up to County's reasonable estimate of the value of the Change in the Work, regardless of the dispute, if said Change in the Work results in an increase in the Contract Sum; and County shall have the right to decrease the Contract Sum to County's reasonable estimated value of the Change in the Work, regardless of the dispute, if said Change in the Work results in a decrease in the Contract Sum.

18.09 Adjustment of Unit Prices. If Unit Prices are stated in the Contract Documents or subsequently agreed upon, and if the quantities originally contemplated are so changed in a proposed Change Order that application of the agreed Unit Prices to the quantities of Work proposed will create a hardship on County or Contractor, the applicable Unit Prices shall be equitably adjusted to prevent such hardship.

18.10 Claims for additional cost. All Claims for additional compensation or for an increase in the Contract Sum shall be made as provided in Article 33. Any change in the Contract Sum resulting from such Claim shall be authorized by Change Order.

18.11 Minor changes in the Work. Subject to approval by County, Architect may order minor changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes may be made by other written order issued through the Construction Manager. Such changes shall be binding on County and Contractor.

18.12 Limitations. Except as expressly provided by this Section, there shall be no change whatsoever in the Plans and Specifications and in the Work. Contractor shall not vary the Work, the Contract Documents, or change, add to, or omit any element, component part, or portion of the Work without the express written consent of Construction Manager or Architect contained in an executed Change Order or Field Order as herein provided. County shall not be liable for the cost for any extra Work or any substitutions, changes, additions, omissions, or deviations from the Plans and Specifications unless the same have been authorized by and the cost thereof approved in writing by Change Order. No extension of time for performance of the Work shall be allowed hereunder unless Claim for such extension shall be made at the time changes in the Work are ordered and such duly adjusted in writing by Construction Manager and Architect. Contractor recognizes and acknowledges that timely completion of the Work is paramount and that its duty is to proceed with the Work in accordance with the Contract Documents, notwithstanding any request for change in the Work, to the extent that proceeding is reasonable and feasible under the circumstances.

18.13 Review of Contract Documents. Execution of the Contract by the Contractor is a representation that the Contractor has visited the Site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents. Contractor shall carefully study and compare the Contract Documents including, but not limited to, the Agreement, General Conditions, Drawings, Specifications, Addenda, and modifications, and shall at once report to Architect and Construction Manager any error, inconsistency, or omission it may discover. Contractor shall not work without proper Drawings and Specifications or interpretations. If Contractor performs any construction activity knowing it involves a recognized error, inconsistency, or omission in the Contract Documents without such notice to Architect and Construction Manager, Contractor shall assume appropriate responsibility for such performance and shall bear an appropriate amount of the costs attributable for correction.

18.14 Requests for Information. Contractor shall review all Requests for Information (RFI), or other Contractor or Subcontractor initiated RFI, prior to submission to Construction Manager to ensure that the information requested in such RFI is not already provided in the Contract Documents. RFI submittals shall come only from Contractor (not from any Subcontractors). Contractor shall prepare RFI on an RFI form approved by the Construction Manager, which shall include a detailed description of the conditions, cause, and/or reason for the request. RFI shall also include a proposed resolution. All RFI shall reference the applicable Construction Documents. A transmittal letter over a

subcontractor's RFI does not constitute an approved form. The Construction Manager will receive and review RFI from the Contractor, and forward each RFI to the Architect and County, with the Construction Manager's recommendations. The Architect and County will review and respond, in writing, to the Construction Manager to RFI about the Contract Documents. The Construction Manager's recommendation and the Architect's response to each request will be made, in writing, within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the RFI.

ARTICLE 19 UNCOVERING AND CORRECTION OF WORK

19.01 Uncovering of Work.

- (a) If any Work is covered contrary to the request of the Architect or Construction Manager, it must be uncovered for the Architect's or the Construction Manager's observation and replaced at the Contractor's expense.
- (b) Architect or Construction Manager may ask to see any other Work that has been covered prior to its inspection by Architect or Construction Manager, and Contractor shall uncover the Work. If such Work is found to be in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to County. If such Work performed by Contractor or Contractor's Subcontractor is found not to be in accordance with the Contract Documents, Contractor shall pay such costs unless it is found that a separate Contractor which is not Contractor's Subcontractor caused this condition, and, in that event, that separate Contractor shall be responsible for the payment of costs to uncover and replace the Work.

19.02 Correction of Work.

- (a) Contractor shall promptly correct all Work rejected or otherwise determined by Construction Manager, Architect or Owner to be defective whether observed before or after Final Completion and whether or not fabricated, installed, or completed.
- (b) In addition to the Contractor's obligation under Article 35, if, within one (1) year after the date of Final Completion of the Work or (if applicable) designated portion thereof, or after the date for commencement of warranties established under Article 35, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be defective, the Contractor shall correct it promptly after receipt of written notice from the County to do so unless the County has previously given the Contractor a written acceptance of such condition. The County shall give such notice promptly after discovery of the condition. If, during the applicable correction period, the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the County waives the rights to require correction by the Contractor and to make a Claim for breach of warranty.
- (c) The one (1) year correction period shall be extended with respect to portions of Work first performed after Final Completion, and for Defective Work which is not promptly corrected pursuant to this Section 19.02 by the period of time between Final Completion and the actual completion or correction of that portion of the Work. The one (1) year period for correction of Work shall not be extended for Defective Work which is promptly corrected by the Contractor pursuant to this Section 19.02.
- (d) Contractor shall bear all cost of correcting Defective Work, including the cost of Construction Manager's and Architect's additional services made necessary thereby, whether before or after Final Completion.
- (e) All Defective Work shall be removed from the Site if necessary, and the Work shall be corrected to comply with the Contract Documents without cost to County.
- (f) Contractor shall bear the cost of making good all Work of Contractor, Contractor's Subcontractors and separate Contractors or existing facilities destroyed or damaged by such removal or correction,

whether before or after Final Completion.

19.03 Contractor's failure to remove Defective Work. If Contractor does not remove such defective or nonconforming Work within a reasonable time fixed by written notice from Construction Manager, County may remove it and may store the materials or equipment at the expense of Contractor. If Contractor does not pay the cost of such removal and storage within ten (10) days thereafter, County may upon ten (10) additional days written notice sell such Work at auction or a private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by Contractor, including compensation for additional architectural services. If such proceeds of sale do not cover all costs, which Contractor should have borne, the difference shall be charged to Contractor and an appropriate Change Order shall be issued. Such Change Order shall not require Contractor's consent to be effective. Said amount may be deducted from any payment thereafter due to Contractor under this or any other Contract with County. If the payments then or thereafter due Contractor are not sufficient to cover such amount, Contractor shall pay the difference to County.

19.04 Contractor's failure to correct Defective Work. If Contractor fails to correct such defective or nonconforming Work, County may correct it in accordance with Section 34.03.

19.05 Acceptance of defective or nonconforming Work. If County prefers to accept defective or nonconforming Work, it may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect an appropriate reduction in the Contract Sum, or, if the amount is determined after final payment, it shall be paid by Contractor. The issuance of the final certificate, final payment, or any provisions in the Contract Documents shall not relieve Contractor of responsibility for faulty materials, equipment, or workmanship. Contractor shall remedy any defects due to, and pay for any damage to, other Work in accordance with the applicable guaranty or warranty provisions of the Contract Documents.

19.06 Emergency corrective action by County. If, in the opinion of County, Defective Work creates a dangerous condition or requires immediate correction or attention to prevent further loss to County or third parties or to prevent interruption of operations of County or third parties, County will attempt to give notice to Contractor. If Contractor cannot be contacted promptly or does not comply with County's request for correction within a reasonable time as determined by County, County may, notwithstanding the provisions of this Contract, proceed to make such correction or provide such attention, and the costs of such correction or attention shall be charged against Contractor. Such action by County shall not relieve Contractor of any warranty obligations provided in this Contract.

PART III SAFETY

ARTICLE 20 PROTECTION OF PERSONS AND PROPERTY

20.01 Contractor's responsibility for safety. Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury, or loss to:

- (a) All employees on the Work and all other persons who may be affected thereby;
- (b) All the Work and all materials and equipment to be incorporated therein, whether in storage on or off the Site, under the care, custody, or control of Contractor or any Subcontractor; and
- (c) Other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course

of construction.

20.02 Environmental Controls. Contractor shall comply with all rules, regulations, ordinances, and statutes that apply to any Work performed under the Contract Documents including, without limitation, any toxic, water, stormwater management and soil pollution controls and air pollution controls specified in California Government Code Section 11017. Contractor shall be responsible for insuring that Contractor's Employees, Subcontractors, and the public are protected from exposure to airborne hazards or contaminated water, soil, or other toxic materials used during or generated by activities on the Site or associated with the Project.

20.03 Compliance with safety requirements. Contractor shall comply with all applicable laws, ordinances, rules, regulations, and lawful orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury, or loss. He/she/it shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent utilities.

20.04 Contractor To Locate Underground Facilities.

A. During construction, Contractor shall comply with Government Code Sections 4216 through 4216.9, and in particular Section 4216.2 which provides, in part: "Except in an emergency, every person planning to conduct any excavation shall contact the appropriate regional notification center at least two (2) working days, but no more than fourteen (14) calendar days, prior to commencing that excavation, if the excavation will be conducted in an area which is known, or reasonably should be known, to contain subsurface installations other than the underground facilities owned or operated by the excavator, and, if practical, the excavator shall delineate with white paint or other suitable markings the area to be excavated. The regional notification center shall provide an inquiry identification number to the person who contacts the center and shall notify any member, if known, who has a subsurface installation in the area of the proposed excavation."

B. Contractor shall contact Underground Service Alert (USA), and schedule the Work to allow ample time for the center to notify its members and, if necessary, for any member to field locate and mark its facilities. Contractor is charged with knowledge of all subsurface conditions reflected in USA records. Prior to commencing excavation or trenching Work, Contractor shall provide Owner with copies of all USA records secured by Contractor. Contractor shall advise Owner of any conflict between information provided in Geotechnical Data and Existing Conditions, the Drawings and that provided by USA records. Contractor's excavation shall be subject to and comply with the Contract Documents.

C. Contractor shall also investigate the existence of existing service laterals, appurtenances or other types of utilities, indicated by the presence of an underground transmission main or other visible facilities, such as buildings, new asphalt, meters and junction boxes, on or adjacent to the Site, even if not shown or indicated in Geotechnical Data and Existing Conditions, the Drawings or that provided by USA records. Contractor shall immediately secure all such available information and notify Owner and the utility owner, in writing, of its discovery.

20.05 Contractor To Protect Underground Facilities.

A. At all times during construction, all operating Underground Facilities shall remain in operation, unless the Contract Documents expressly indicate otherwise. Contractor shall maintain such Underground Facilities in service where appropriate; shall repair any damage to them caused by the Work; and shall incorporate them into the Work, including reasonable adjustments to the design location (including minor relocations) of the existing or new installations. Contractor shall take

immediate action to restore any in service installations damaged by Contractor's operations.

B. Prior to performing Work at the Site, Contractor shall lay out the locations of Underground Facilities that are to remain in service and other significant known underground installations indicated by the Underground Facilities Data. Contractor shall further locate, by carefully excavating with small equipment, potholing and principally by hand, all such utilities or installations that are to remain and that are subject to damage. If additional utilities whose locations are unknown are discovered, Contractor shall immediately report to Owner for disposition of the same. Additional compensation or extension of time on account of utilities not shown or otherwise brought to Contractor's attention, including reasonable action taken to protect or repair damage, shall be determined as provided in this Division 007100.

C. If during construction, an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated in the materials supplied by Owner for bidding or in information on file at USA or otherwise reasonably available to Contractor, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby (and in no event later than seven [7] Days), and prior to performing any Work in connection therewith (except in an emergency), identify the owner of such Underground Facility and give written notice to that owner and to Owner. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. The cost of all of the following will be included in the Contract Sum and Contractor shall have full responsibility for (a) reviewing and checking all available information and data including, but not limited to, information made available for bidding and information on file at USA; (b) locating all Underground Facilities shown or indicated in the Contract Documents, available information, or indicated by visual observation including, but not limited to, and by way of example only, engaging qualified locating services and all necessary backhoeing and potholing; (c) coordination of the Work with the owners of such Underground Facilities during construction; and (d) the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

E. Consistent with California Government Code Section 4215, as between Owner and Contractor, Owner will be responsible for the timely removal, relocation, or protection of existing main or trunk line utility facilities located on the Site only if such utilities are not identified in the Contract Documents or information made available for bidding. Owner will compensate for the cost of locating and repairing damage not due to Contractor's failure to exercise reasonable care, removing and relocating such main or trunk line utility facilities not indicated in the Contract Documents or information made available for bidding with reasonable accuracy, and equipment on the Project necessarily idled during such Work. Contractor shall not be assessed liquidated damages for delay in completion of the Project, when such delay was caused by the failure of Owner or the utility to provide for removal or relocation of such utility facilities.

20.06 Concealed Or Unknown Conditions

A. If either of the following conditions is encountered at Site when digging trenches or other excavations that extend deeper than four (4) feet below the surface, Contractor shall give a written Notice of Differing Site Conditions to Owner promptly before conditions are disturbed, except in an emergency as set forth in this Division 007100, and in no event later than seven (7) Days after first observance of:

1. Subsurface or latent physical conditions which differ materially from those indicated in the Contract Documents; or
2. Unknown physical conditions of an unusual nature or which differ materially from those ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract Documents.

B. In response to Contractor's Notice of Differing Site Conditions under this Section, Owner will

investigate the identified conditions, and if they differ materially and cause increase or decrease in Contractor's cost of, or time required for, performance of any part of the Work, Owner will negotiate the appropriate Change Order following the procedures set forth in the Contract Documents. If Owner determines that physical conditions at the Site are not latent or are not materially different from those indicated in Contract Documents or that no change in terms of the Contract Documents is justified, Owner will so notify Contractor in writing, stating reasons.

C. Contractor shall not be entitled to any adjustment in the Contract Sum or Contract Time regarding claimed latent or materially different Site conditions (whether above or below grade) if Contractor knew or should have known of the existence of such conditions at the time Contractor submitted its Bid, failed to give proper notice, or relied upon information, conclusions, opinions or deductions of the kind that the Contract Documents preclude reliance upon.

D. Regarding Underground Facilities, Contractor shall be allowed an increase in the Contract Sum or an extension of the Contract Time, or both, to the extent that they are attributable to the existence of any Underground Facility that is owned and was built by Owner only where the Underground Facility:

1. Was not shown or indicated in the Contract Documents or in the information supplied for bidding purposes or in information on file at USA; and

2. Contractor did not know of it; and

3. Contractor could not reasonably have been expected to be aware of it or to have anticipated it from the information available. (For example, if surface conditions such as pavement repairs, valve covers, or other markings, indicate the presence of an Underground Facility, then an increase in the Contract Sum or an extension of the Contract Time will not be due, even if the Underground Facility was not indicated in the Contract Documents, in the information supplied to Contractor for bidding purposes, in information on file at USA, or otherwise reasonably available to Contractor.)

E. Contractor shall bear the risk that Underground Facilities not owned or built by Owner may differ in nature or locations shown in information made available by Owner for bidding purposes, in information on file at USA, or otherwise reasonably available to Contractor. Underground Facilities are inherent in construction involving digging of trenches or other excavations on Owner's Project, and Contractor is to apply its skill and industry to verify the information available.

F. Contractor's compensation for claimed latent or materially different Site conditions shall be limited to the actual, reasonable, incremental increase in cost of that portion of the Work, resulting from the claimed latent or materially different Site conditions. Such calculation shall take into account the estimated value of that portion of the Work and the actual value of that portion of the Work, using for guidance Contractor's or its Subcontractor's bid amount and actual amounts incurred for that portion of the Work and the reasonable expectation (if any) of differing or difficult site conditions in the Work area based on the available records and locale of the Work. For example, if Contractor excavates in an area unexpected, then such costs would be recoverable entirely; while if Contractor extends an existing excavation, then such costs would be recoverable if the resulting excavation costs in that Work area exceeded the reasonable expectations therefore.

20.07 Trench safety. For all trenches to be made in connection with the Work, Contractor shall submit 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 trenches. If such plan varies from the shoring system standards, a registered civil or structural engineer shall prepare the plan. The plan shall be reviewed, and must receive approval as adequate to protect worker safety, by County or by a registered civil or structural engineer employed by County, in advance of excavation. The shoring, sloping, or protective system must be at least as effective as that required by the Construction Safety Orders and in accordance with California Labor Code Section 6705.

20.08 Hazardous substance. The term "hazardous substance" means any substance on the list of

hazardous substances established by the Director of Industrial Relations pursuant to the Labor Code Section 6382, which includes asbestos, lead, toxic chemicals, contaminants, any substance designated by the Environmental Protection Agency as a hazardous substance, and other pollutants and contaminants.

(a) If Contractor encounters on the property any substance reasonably believed to be a Hazardous Substance that has not been rendered harmless, i.e., not potentially hazardous to human health, Contractor shall immediately stop Work in the area affected and report the condition to County, Construction Manager and Architect in writing.

(b) Neither Contractor nor any Subcontractor shall cause or permit any Hazardous Substance to be brought upon the property or used in the Work without the prior written consent of County. Contractor and each Subcontractor shall comply with all laws regarding the handling, treatment, presence, removal, storage, decontamination, cleanup, transportation, or disposal of Hazardous Substances brought onto the property by Contractor, its Subcontractors, and/or their personnel.

(c) Any handling, treatment, removal, decontamination, cleanup, transportation, disposal, or disturbance in any of Hazardous Substances shall only be performed by Contractor or any Subcontractor licensed and certified to perform the Work. Any hazardous substance abatement or remediation Work will be performed in such a way that is legally consistent with the recommendations of the certified County agent, appropriate governmental agencies, and all applicable laws.

(d) If there is a Hazardous Substance on the property, Contractor shall protect adjoining property and provide barricades, temporary fences, and covered walkways required to protect the health and safety of passersby as required by this Agreement, prudent construction practices, and all applicable laws.

20.09 Contractor's safety monitor. Contractor shall designate a responsible member of Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be Contractor's Superintendent unless otherwise designated in writing by Contractor to County, Construction Manager, and Architect.

20.10 Unsafe loading. Contractor shall not load nor permit any part of any structure or pavement to be loaded in any manner that will endanger the structure or pavement, nor shall Contractor subject any part of Work or adjacent property to stresses or pressures that will endanger it. Contractor shall conduct all necessary existing conditions investigations regarding structural, mechanical, electrical or any other existing systems, shall perform Work consistent with such existing conditions, and shall have full responsibility for insufficiencies or damage resulting from insufficiencies of existing systems, equipment or structures to accommodate performing the Work.

20.11 Emergencies. In any emergency affecting the safety of persons or property, Contractor shall act, at his/her/its discretion, to prevent threatened damage, injury, or loss. Any additional compensation or extension of time claimed by Contractor on account of emergency Work shall be determined as provided in Article 18 – Changes in the Work.

20.12 Accidents. Contractor shall promptly report, in writing, to Architect, Construction Manager, and County all accidents whatsoever arising out of, or in connection with the performance of the Work, whether on or off the Site, which caused death, personal injury, or property damage, giving full details and statements of witnesses. In addition, if death or serious injuries or serious damages are caused, Contractor shall report the accident immediately to Construction Manager by telephone or messenger. Contractor shall thereafter promptly report the facts, in writing, to Architect, Construction Manager, and County giving full details of the accident.

PART IV PAYMENTS

ARTICLE 21 PROGRESS PAYMENTS

21.01 Monthly progress payments. Monthly progress payments shall be made to Contractor, as provided in this Article.

21.02 Schedule of values. Before Contractor submits any application for payment, Contractor shall submit to Construction Manager and Architect a schedule of values of the various portions of the Work, to be used to enable County to estimate the timing and amounts of the successive progress payments. If required by Construction Manager, the schedule shall include quantities aggregating the total Contract Sum, divided so as to show Contractor's anticipated payments to Subcontractors. The schedule shall be prepared in such form as may be specified in the Contract Documents or by Construction Manager, or as may be agreed upon by Construction Manager and Contractor. The schedule shall include such data as Construction Manager and Architect may require substantiating its correctness. Each item in the schedule shall include its proper share of overhead and profit. This schedule, when approved by Construction Manager, shall be used only for preparing and reviewing Contractor's applications for payment, and will not be considered as fixing a basis for additions to or deductions from the Contract Sum.

21.03 Application for payment. On or before the fifth day of each month, Contractor shall submit to Construction Manager an application for payment including a schedule of values, requesting payment for the Work completed up to the end of that same month, using the standard AIA form for requesting progress payments or such other form as may be prescribed by County. The application shall be itemized by task and shall be supported by such data substantiating Contractor's right to payment as County, Architect or Construction Manager may require.

21.04 Payment for stored materials and equipment. If payments are to be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the Site, or at some other location agreed upon in writing, such payments shall be conditioned upon submission by Contractor of bills of sale or such other procedures satisfactory to County to establish County's title to such materials or equipment or otherwise protect County's interest including applicable insurance and transportation to the Site.

21.05 Certificates for payment. If Contractor has made application for payment as set forth above, Construction Manager will, with reasonable promptness but not more than ten (10) days after the receipt of the application, issue a certificate for payment to County, with a copy to Contractor, for such amount as Construction Manager determines to be properly due, or state in writing the reasons for withholding a certificate as provided in Section 22.01. A payment request determined not to be a proper payment request suitable for payment will be returned to Contractor within seven (7) days with a statement setting forth the reasons why the payment request is not proper. Payments shall be made on demands drawn in the manner required by law, accompanied by a certificate signed by Project Manager, stating the Work for which payment is demanded has been performed in accordance with the terms of the Contract. Contractor is entitled to interest pursuant to Public Contract Code Section 20104.50 if County fails to make the progress payment within thirty (30) days after County Auditor Controller's receipt of an undisputed properly submitted payment request.

21.06 Findings to issue certificate of payment. In determining to issue a certificate of payment, Construction Manager and Architect must make the following findings, based on observations at the Site, the schedule of values, and the data included in the application for payment:

- (a) that the Work has progressed to the point indicated;
- (b) that, to the best of their knowledge, information, and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to the results of any subsequent tests required by the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and to any specific qualifications stated in his/her/its certificate); and
- (c) that Contractor is entitled to payment in the amount certified.

21.07 Amount of progress payment. The amount of each progress payment shall equal ninety-five percent (95%) of the estimated value of Work performed up through the last day of the previous month, less the aggregate of all previous payments. The amount of the progress payment may be further reduced by any withholdings or deductions that may be taken from the payment pursuant to other provisions of this Contract. For the purpose of determining the amount of any particular progress payment, the value of Work completed is only an estimate; such value or estimate shall be used for no other purpose in connection with this Contract and shall not be binding on County Architect or Construction Manager for any other purpose or any other payment, and County, Architect and Construction Manager shall have the right to correct any error in such value or estimate for later payments.

21.08 Payment by County. Promptly after Construction Manager has issued a certificate for payment, County shall submit the appropriate documentation to the Monterey County Auditor-Controller, who shall make payment to Contractor within thirty (30) days thereafter. All materials and Work covered by payments made shall thereupon become the sole property of County, and this provision shall not be construed as relieving Contractor from the continuing responsibility for all materials and Work upon which payments have been made or the restoration of any damaged Work, or as a waiver of any right of County to require the fulfillment of all terms of this Agreement. Title to all Work completed in the course of construction and to all materials, including the Specifications and other documents prepared by Architect, Construction Manager, and/or Contractor on account of which payment has been made shall be vested in County.

21.09 Limited effect of issuance of certificate or progress payment. By issuing a certificate for payment, Construction Manager and Architect shall not thereby be deemed to represent that they have made exhaustive or continuous on-site inspections to check the quality or quantity of the Work or that they have reviewed the construction means, methods, techniques, sequences, or procedures, or that they have made any examination to ascertain how or for what purpose Contractor has used the monies previously paid on account of the Contract Sum. Further, no certificate for a progress payment, nor any progress payment, nor any partial or entire use or occupancy of the Project by County, shall constitute an acceptance of any Work not in accordance with the Contract Documents.

ARTICLE 22 WITHHOLDING PAYMENTS

22.01 Grounds for withholding payment. The Architect or Construction Manager may decline to approve an application for payment and may withhold his/her certificate for payment as to all or part of the payment amount requested, to the extent reasonably necessary to protect County, if in the Architect's or Construction Manager's opinion he/she is not able to make the findings set forth in Section 21.06. Architect or Construction Manager may also decline to approve payment, in whole or in part, and, based on subsequently discovered evidence or subsequent inspections, Architect or Construction Manager may nullify the whole or any part of any certificate for payment previously issued, to such extent as may be necessary in the Architect's or Construction Manager's opinion to

protect County. Such withholding of the certificate or of any amounts requested by Contractor in connection with the certificate, may be based on any of the following grounds:

- (a) Defective Work not remedied;
- (b) third-party Claims filed or reasonable evidence indicating probable filing of such Claim;
- (c) failure of Contractor to make payments properly to Subcontractors or for labor, materials, or equipment;
- (d) reasonable doubt that the Work can be completed for the unpaid balance of the Contract Sum;
- (e) damage to another Contractor;
- (f) reasonable indication that the Work will not be completed within the Contract Time;
- (g) unsatisfactory prosecution of the Work by Contractor;
- (h) stop notices filed for any portion of the Work;
- (i) failure or refusal of Contractor to fully comply with the Contract requirements; or
- (j) Contractor's failure to comply within a reasonable time with Article 20 of these conditions.

22.02 Application of withheld amounts. County may apply any such withheld amounts to payment of such Claims or obligations, in County's sole discretion. In so doing, County shall be deemed the agent of Contractor and any payment so made by County shall be considered as a payment made under Contract by County to Contractor. County shall not be liable to Contractor for any such payments made in good faith. Such payments may be made without prior judicial determination of such Claim or obligation. County will render to Contractor a proper accounting of any funds so disbursed on behalf of Contractor.

22.03 Payment when grounds removed. When the above grounds for withholding payment are removed by Contractor or by County, payment of the withheld amounts or the remaining balance thereof shall be made to Contractor.

ARTICLE 23 COMPLETION AND FINAL PAYMENT

23.01 Substantial Completion.

A. When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall notify the Construction Manager, and the Contractor and Construction Manager shall jointly prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

B. Upon receipt of the list, the Architect, assisted by the Construction Manager, will make an inspection to determine whether the Work, or designated portion thereof, is substantially complete. If the Architect's inspection discloses any item, whether or not included on the list, which is not sufficiently complete in accordance with the requirements of the Contract Documents so that the Owner can occupy or utilize the Work, or designated portion thereof, for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect, assisted by the Construction Manager, to determine Substantial Completion.

C. When the Architect, assisted by the Construction Manager, determines that the Work, or designated portion thereof, is substantially complete, the Construction Manager will prepare, and the Construction Manager and Architect shall execute, a Certificate of Substantial Completion that shall establish the

date of Substantial Completion; shall establish responsibilities of the County and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Final Completion of the Work, or designated portion thereof, unless otherwise provided in the Certificate of Substantial Completion.

D. The Certificate of Substantial Completion shall be submitted to the County and Contractor for their written acceptance of responsibilities assigned to them in such Certificate.

23.02 Application for final payment. When the Work is complete, Contractor shall submit to Construction Manager the following documents:

- (a) a written notice that the Work is ready for final inspection;
- (b) an application for final payment;
- (c) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which County might in any way be responsible, have been paid or otherwise satisfied;
- (d) consent of the sureties, if any, to final payment; and
- (e) if required by County, other proof (such as receipts, releases, and waivers of liens) establishing payment or satisfaction of all obligations arising out of the Contract, to the extent and in such form as may be designated by County.

23.03 Bond for outstanding Claims or liens. If any person refuses to furnish a release or waiver required by County, Contractor may furnish a Bond satisfactory to County to indemnify and defend County against any Claim that might be made against County or any lien that might be placed against the Work on account of such person. If any such Claim or lien remains unsatisfied after all payments are made, Contractor or the Surety shall pay to County all monies that County may be compelled to pay in discharging such Claim or lien, including all costs and reasonable attorneys' fees.

23.04 Inspection and final certificate. Upon receipt of the application for final payment and documents required per Section 23.02, Architect and Construction Manager will promptly inspect the Work. Architect and Construction Manager shall issue a certificate for final payment, with copies to both County and Contractor, if they make the following findings:

- (a) that the Work is acceptable under the Contract Documents;
- (b) that the Contract has been fully performed;
- (c) that to the best of their knowledge, information, and belief, and on the basis of their observations and inspections, the Work has been completed in accordance with the terms and conditions of the Contract Documents;
- (d) that all potential liens or Claims for Subcontractors' services and for labor, equipment, and materials on the Work have been satisfied or adequately secured;
- (e) that the balance noted in the final certificate is due and payable; and
- (f) that all necessary approvals of applicable federal, state, or local agencies and/or authorities have been issued.

23.05 Determination not to issue certificate for final payment. If the Architect and Construction Manager determine that the necessary findings cannot be made to issue a final certificate, the Construction Manager shall promptly notify Contractor, in writing, of the reasons for such determination. Contractor shall promptly thereafter take appropriate steps to remove the grounds for denial of the final certificate.

23.06 Acceptance by Board of Supervisors. Promptly after the Architect and Construction Manager

issue the certificate for final payment, the matter will be submitted to the County Board of Supervisors for final acceptance of the Work. Work on the Contract shall be deemed complete when the Board of Supervisors accepts the Work. Not later than fifteen (15) days after such acceptance, County shall record its notice of completion.

23.07 Effect of final payment as to County. The making of the final payment by County to Contractor hereunder shall not constitute a waiver of any Claims which County may now or thereafter have against Contractor by reason of this Agreement or any other matter related to the Work.

23.08 Effect of final payment as to Contractor. Acceptance of final payment shall constitute a waiver of all Claims by Contractor except those previously made, in writing, and remaining still unsettled.

23.09 Final Payment. The final payment, if unencumbered, or any part thereof unencumbered, shall be made not later than 60 days after completion of the Work and submission of all completion documents.

ARTICLE 24 ALTERNATIVE PAYMENT OF WITHHELD FUNDS

24.01 Alternatives to withholding. This Contract requires a five percent (5%) withholding from progress payments. Progress payments shall not be made in excess of 95 percent (95%) of the actual Work completed plus a like percentage of the value of material delivered on the ground or stored subject to, or under the control of, County, and unused. County shall withhold five percent (5%) from the progress payments until final completion and acceptance of the Project by the Board of Supervisors. At Contractor's request, County shall make payment of these funds withheld from progress payments through the use of the escrow procedures provided in this Section and either Section 24.02 or Section 24.03. As a prerequisite to compliance with Section 24.02 or Section 24.03, Contractor shall select an escrow agent, who shall be County Auditor-Controller or any state or federally chartered bank in California; the parties shall enter into an escrow Agreement meeting the requirements of Public Contract Code Section 22300; and the parties shall deposit with the escrow agent the escrow Agreement, the withheld portions of the progress payments that have accrued before opening of the escrow, all future withheld portions as they accrue, and all other deposits required below. Contractor shall pay all expenses incurred in implementing the procedures set forth herein.

24.02 Alternative one: substitution of securities for withheld funds. At Contractor's request, eligible securities provided by Contractor, equivalent to the amount withheld, shall be deposited with the escrow agent, who shall then pay the withheld monies to Contractor. After the initial deposits and disbursements, County shall deposit all additional amounts to be withheld with the escrow agent as they accrue, and if Contractor desires their release, Contractor shall increase the amount of the securities on deposit, if necessary, in order that the value of the securities on deposit shall equal or exceed the total of all amounts currently and previously authorized to be withheld under the Contract without the substitution of securities. Upon satisfaction of that condition, the escrow agent shall immediately pay the additional withheld amounts to Contractor. Upon satisfactory completion of the Contract, the securities shall be returned to Contractor.

24.03 Alternative two: investment of withheld funds. Alternatively, Contractor may direct that the withheld funds deposited in the escrow be invested in eligible securities. Upon satisfactory completion of the Contract, Contractor shall receive from the escrow agent all securities, interest, and payments received by the escrow agent from County. Contractor shall pay to each Subcontractor, not later than twenty (20) days after receipt of the payment, the respective amount of interest earned, net of costs

attributed to retention withheld from each Subcontractor, on the amount of retention withheld to ensure the performance of Contractor.

24.04 Eligible securities: interest. Securities eligible to be used under the above Sections shall include those listed in Government Code Section 16430, 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 Contractor and County. The parties must agree upon the value of the securities, as a condition of their deposit in the escrow. Contractor shall be the beneficial owner of any securities deposited pursuant to this Article 24 and shall receive any interest thereon. Contractor may withdraw interest earned on securities held in escrow at any time without notice to County.

24.05 Inapplicability of Article 24 to certain Contracts. The provisions of this Article 24 shall not apply to Contracts in which there will be financing provided by the Farmers Home Administration of the United States Department of Agriculture pursuant to the Consolidated Farm and Rural Development Act (7 U.S.C. Sec. 1921 et seq.) and where federal regulations or policies, or both, do not allow the substitution of securities.

PART V EMPLOYMENT PRACTICES

ARTICLE 25 APPRENTICES

25.01 Compliance with Labor Code apprenticeship requirements. Contractor and all Subcontractors shall comply with the provisions of Labor Code Sections 1777.5, 1777.6, and 1777.7, when applicable, pertaining to apprentices, and with all applicable regulations pursuant thereto (Title 8, California Code of Regulations, Sections 200 et seq., especially Sections 227 et seq.), including, but not limited to, provisions relating to required or permitted ratios of apprentices to experienced workers. When any question exists concerning these requirements, Contractor and/or any Subcontractor concerned should contact the Division of Apprenticeship Standards, 525 Golden Gate Avenue, San Francisco, California, or one (1) of its branch offices, prior to commencement of Work. The prime Contractor is responsible for ensuring compliance with this Section.

25.02 State policy. It is State policy to encourage the employment and training of apprentices on Public Works Contracts in conformity with standards set by law.

ARTICLE 26 NON-DISCRIMINATION PROVISIONS

26.01 Non-discrimination in employment practices. Contractor shall ensure that the evaluation and treatment of its employees and applicants for employment and all persons receiving and requesting services are free of such discrimination. Contractor and any Subcontractor shall, in the performance of this Agreement, fully comply with all federal, state, and local laws and regulations which prohibit discrimination. The provision of services primarily or exclusively to such target population as may be designated in this Agreement shall not be deemed to be prohibited discrimination.

26.02 "Discrimination" defined. As used in this Contract, the term "discrimination" includes, but is not limited to, the illegal denial of equal employment opportunity, harassment (including sexual harassment and violent harassment), disparate treatment, favoritism, subjection to unfair or unequal working conditions, and/or any other prohibited discriminatory practice. The term also includes any

act of retaliation.

26.03 Application of Monterey County Code, Chapter 2.80. The provisions of Monterey County Code (MCC), Title 2, Chapter 2.80, apply to activities conducted pursuant to this Contract. Contractor and its officers and employees, in their actions under this Contract, are agents of the Owner within the meaning of MCC Chapter 2.80, and are responsible for ensuring that their workplace and the services that they provide are free from discrimination, as required by MCC Chapter 2.80. Complaints of discrimination made by Contractor, Subcontractor(s), or any of their employees or agents against the Owner may be investigated and resolved using the procedures established by MCC Chapter 2.80. Contractor shall establish and follow its own written procedures for the prompt and fair resolution of discrimination complaints made against Contractor by its own employees, agents and third parties, and shall provide a copy of such procedures to County upon demand by County.

26.04 Compliance with laws. During the performance of this Agreement, Contractor shall comply with all applicable federal, state, and local laws and regulations, which prohibit discrimination, including, but not limited to, the following:

- (a) California Labor Code Section 1735;
- (b) California Fair Employment and Housing Act, Government Code Sections 12900 et seq., and the administrative regulations issued thereunder, Title 2 California Code of Regulations, Sections 7285.0 et seq. (Division 4 – Fair Employment and Housing Commission);
- (c) California Government Code Sections 111–5 - 11139.5 (Title 2, Div. 3, Part 1, Chap.1, Art. 9.5) and any applicable administrative regulations issued thereunder;
- (d) Federal Civil Rights Acts of 1964 and 1991 (see especially Title VII, 42 USC Sections 2000d et seq.), as amended, and all administrative rules and regulations issued thereunder (see especially 45 CFR Part 84); and all guidelines and interpretations issued pursuant thereto;
- (e) The Rehabilitation Act of 1973, Sections 503 and 504 (29 USC Sections 793 and 794), as amended; all requirements imposed by the applicable HHS regulations (45 CFR Part 84); and all guidelines and interpretations issued pursuant thereto;
- (f) Americans With Disabilities Act of 1990 (P.L. 101- 336), as amended, 42 USC Sections 12101 et seq., and 47 USC Sections 225 and 611, and any federal regulations issued pursuant thereto (see 24 CFR Chapter 1; 28 CFR Parts 35 and 36; 29 CFR Parts 1602, 1627 and 1630; and 36 CFR Part 1191;
- (g) Unruh Civil Rights Act, California Civil Code Sections 51 et seq.; and
- (h) Monterey County Code, Title 2, Chapter 2.80, as amended and procedures issued pursuant thereto.

26.05 Written assurances. Upon request by County, Contractor will give any written assurances of compliance with the Civil Rights Acts of 1964 and 1991, as amended, the Rehabilitation Act of 1973, as amended, the Americans With Disabilities Act of 1990, as amended, and/or Executive Order 11246, as may be required by the federal government in connection with this Contract, pursuant to 45 CFR Section 80.4 or 45 CFR Section 84.5 or other applicable state or federal regulations.

26.06 Written nondiscrimination policy. Contractor shall maintain a written statement of its nondiscrimination policies, which shall be consistent with the terms of this Agreement. Such statement shall be available to Contractor's employees, the Owner, Owner's officers and employees, and members of the public, upon request.

26.07 Notice to labor unions. Contractor shall give written notice of its obligations under Sections 26.01 through 26.09 to labor organizations with which it has a collective bargaining or other Agreement.

26.08 Access to records by government agencies. Contractor shall permit access by Owner and by representatives of the California Department of Fair Employment and Housing and the U.S. Equal Employment Opportunity Commission, and any federal and/or state agency providing funds for this Contract upon reasonable notice at any time during normal business hours, but in no case on less than twenty-four (24) hours notice, to such of its books, records, accounts, facilities, and other sources of information as the inspecting party may deem appropriate to ascertain compliance with these nondiscrimination provisions.

26.09 Binding on Subcontractors. The provisions of Sections 26.01 through 26.09 shall also apply to all of Contractor's Subcontractors. Contractor shall include the nondiscrimination and compliance provisions of these Sections in all Subcontracts to perform Work or provide services under this Contract.

ARTICLE 27 HOURS OF WORK

27.01 Eight (8) hour day; forty (40) hour week. No Work shall be performed by employees of Contractors in excess of eight (8) hours per day or forty (40) hours during any one (1) week, unless such employees are compensated for all such excess hours at not less than one-and-one half times the basic rate of pay, as provided in Labor Code Section 1815. Holiday Work when permitted by law shall also be compensated at not less than one-and-one half times the basic rate of pay.

27.02 Penalties. Pursuant to Labor Code Section 1813, Contractor shall forfeit, as a penalty to County, \$25 for each worker employed in the execution of the Contract by Contractor or any Subcontractor under Contractor for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any one (1) calendar day and forty (40) hours in any one (1) calendar week in violation of the provisions of the Labor Code Sections 1810 through 1815.

27.03 Approvals. Contractor will not be entitled to additional compensation for Work performed outside of regular working hours, except to the extent such compensation is approved in advance, in writing, by Construction Manager. If so approved, such compensation shall in such event cover only the direct cost of the premium portion of the time involved, when permitted, and be without any overhead or profit.

ARTICLE 28 PREVAILING WAGES

28.01 Prevailing wage rates determined. The Director of the California Department of Industrial Relations has determined the general prevailing rate of per diem wages in the locality in which said public Work is to be performed for each craft, classification, or type of worker needed to execute the Contract in accordance with Labor Code Sections 1770 through 1775. Copies of the prevailing rate of per diem wages are on file and shall be made available to any interested party on request in the RMA – Public Works, Parks and Facilities office located at 1441 Schilling Place, Second Floor, Salinas California 93901. Current prevailing wage rate schedules can also be found at the California Department of Industrial Relations website located at <http://www.dir.ca.gov/DLSR/PWD/>.

28.02 Payment of prevailing wage rates required. Contractor and all Subcontractors performing Work under this Contract shall pay wages to their workers employed on such Work at not less than the general prevailing rate of per diem wages for such Work, as required by Labor Code Section 1771.

28.03 Penalties. Failure to pay such prevailing wages shall subject the employer to the penalties set forth in Labor Code Section 1775.

28.04 Contractor stipulates that it shall comply with all applicable wage and hour laws, including without limitation, California Labor Code Section 1776 and Sections 1810 through 1815. Failure to so comply shall constitute a default under this Contract.

ARTICLE 29 PAYROLL RECORDS

29.01 Compliance with Labor Code Section 1776. Contractor and all Subcontractors shall comply with Labor Code Section 1776 as may be amended from time to time. Contractor shall be responsible for compliance with these provisions by his /her/its Subcontractors.

29.02 Accurate payroll records required. Contractor and each Subcontractor shall keep accurate payroll records, showing the name, address, social security number, Work classification, straight time, and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice worker, or other employee employed by him/her/it in connection with the public Work.

29.03 Certification and inspection of payroll records. The payroll records enumerated under Section 29.02 shall be certified and shall be available for inspection at all reasonable hours at the principal office of Contractor or Subcontractor on the following basis:

(a) 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.

(b) A certified copy of all payroll records enumerated in Section 29.02 shall be made available for inspection, or furnished upon request, to a representative of County, and/or the Division of Labor Standards Enforcement of the Department of Industrial Relations (DIR).

(c) A certified copy of all payroll records enumerated in Section 29.02 shall be made available upon request to the public for inspection or copies thereof made; provided however, that a request by the public shall be made through County, or the Division of Labor Standards Enforcement of the DIR. The public shall not be given access to such records at the principal offices of Contractor.

29.04 Filing of records. Contractor and each Subcontractor shall file a certified copy of the records enumerated in Section 29.02 with the entity that requested such records within ten (10) days after receipt of a written request.

29.05 Elimination of personal identification. Any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by County, or the Division of Labor Standards Enforcement of the DIR shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address, and social security number. The name and address of Contractor or Subcontractor awarded the Contract or performing the Contract shall not be marked or obliterated. Any copy of records made available for inspection by, or furnished to, a joint labor management committee established pursuant to the Federal Labor Management Cooperation Act of 1978 (29USC 175a) shall be marked or obliterated only to prevent disclosure of an individual's social security number.

29.06 Notice to County concerning location of records. Contractor and each Subcontractor shall inform County as to the location of the records enumerated under Section 29.02, including the street address, city, and county, and shall within five (5) Work days, provide a notice of any change of

location and address.

29.07 Notice of noncompliance; penalties. The Contractor or Subcontractor has ten (10) days in which to comply subsequent to receipt of a written notice requesting the records enumerated in Section 29.02. In the event that the Contractor or Subcontractor fails to comply with the ten (10) day period, he/she/it shall, as a penalty to the County, forfeit one hundred dollars (\$100) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Labor Standards Enforcement of the DIR, these penalties shall be withheld from progress payments then due. The Contractor is not subject to a penalty assessment pursuant to this Section due to the failure of a Subcontractor to comply with this Section.

29.08 DIR Requirements. All Contractors and Subcontractors must furnish electronic certified payroll records directly to the Labor Commissioner (Division of Labor Standards Enforcement of the DIR). Additionally, the awarded Contractor shall submit electronic certified payroll records to Construction Manager with each application for payment and/or concurrent with the required monthly submittal to the DIR.

PART VI LEGAL RELATIONS

ARTICLE 30 COMPLIANCE WITH LAWS

30.01 Compliance with laws. Contractor shall keep fully informed of and shall comply with all laws, ordinances, regulations and orders of any properly constituted authority affecting the Contract Documents, Work and persons connected with Work, and shall protect and indemnify Owner and its officers, employees, consultants and agents against any Claim or liability, including attorney's fees, arising from or based on violation of law, ordinance, regulation or order, whether by Contractor or by Subcontractors, employees or agents. Authorized persons may at any time enter upon any part of Work to ascertain compliance of all applicable laws, ordinances, regulations and orders. Contractor shall give all notices and comply with all laws, ordinances, rules, regulations, and orders of any public authority bearing on the performance of the Work. If Contractor observes that any of the Contract Documents are at variance therewith in any respect, he/she/it shall promptly notify Construction Manager in writing, and any necessary changes shall be adjusted by appropriate modification. If Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules, and regulations, and without such notice to Construction Manager, Contractor shall assume full responsibility therefore, and shall bear all costs attributable thereto. Without limitation of any other provision hereof, if Contractor performs any Work which is contrary to such laws, ordinances, codes, rules and regulations, Contractor shall without additional reimbursement or extension of time make all changes and bear all costs as required to comply.

30.02 Rules of governing agencies. All Work and materials shall be in full accordance with the Rules and Regulations of the State Fire Marshall, the Construction Safety Orders of the Division of Industrial Safety of the DIR, and all other applicable codes and regulations.

30.03 Compliance with uniform codes. All Work and materials shall comply with the current editions of the California Building Code, the California Electric Code, the California Plumbing Code, the California Mechanical Code, and the California Administrative Code, and Title 18 of the Monterey County Code.

30.04 Statutory regulation of Public Works. This Contract is subject to all statutes of the State of

California regulating the performance of Work by a public agency or political subdivision of such state, and particularly the following:

- Public Contract Code Sections 4100-4114 (Subletting and Subcontracting Fair Practices Act).
- Labor Code Sections 1720-1743 (Public Works, Scope, and Operation).
- Labor Code Sections 1770-1781 (Public Works, Wages).
- Labor Code Sections 1810-1815 (Public Works, Working Hours).

All Work performed under this Contract, whether by Contractor or by any Subcontractor, shall comply with all such statutes.

30.05 Compliance with Clean Air and Clean Water Acts. Contractor and all Subcontractors shall comply with the Federal Clean Air Act (42 USC Sections 1857 et seq. and 42 USC Sections 7401 et seq.) and with the Federal Clean Water Act (33 USC Sections 1251 et seq.) and all other applicable federal air and water pollution control rules and regulations.

30.06 Federally funded Contracts. If the Project for which the Work under this Contract is to be performed is funded in whole or in part by grants or loans from the federal government, Contractor and all Subcontractors shall comply with regulations adopted by the U.S. Secretary of Labor pursuant to 40 USC Section 276c and with all other statutes, rules, and regulations that are applicable because of such federal funding.

30.07 Kickbacks and illegal withholdings of pay. Contractor and all Subcontractors shall comply with the provisions of Labor Code Sections 221 and 222, which prohibit kickbacks and withholdings from employee wages.

30.08 Illegal fees. Contractor and all Subcontractors shall comply with the provisions of Labor Code Sections 1778, 1779, and 1780, which prohibit the taking of any portion of the wages of workers employed on Public Works Projects and the collection of certain fees from workers employed on Public Works Projects and from applicants for such employment.

30.09 Provisions required by law deemed inserted. Each and every provision required by law to be inserted in this Contract shall be deemed to be inserted herein as may be amended from time to time, and this Contract shall be read and enforced as though it were included herein. If through mistake or otherwise any such provision is not accurately set forth in the Contract Documents, or is not correctly set forth, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion or correction through a written amendment signed by the Contractor and Owner.

30.10 Good faith effort to employ Monterey Bay Area residents. For all provisions of the Good faith effort to employ Monterey Bay area residents, see Instructions to Bidders, Division 002000, number 16, and Contractor's Certification of Good Faith Effort to Employ Monterey Bay Area Residents.

30.11 Employment of undocumented aliens. Comply with California Public Contract Code Section 6101 which provides that no state agency or department, as defined in Public Contract Code Section 10335.7, that is subject to the Public Contract Code, shall award a public works or purchase contract to a bidder or contractor, nor shall a bidder or contractor be eligible to bid for or receive a public works or purchase contract, who has, in the preceding five (5) years, been convicted of violation of a state or federal law respecting the employment of undocumented aliens.

30.12 Nondiscrimination. No person or entity shall discriminate in the employment of persons upon Public Works because of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, sexual preference, or gender of such persons, except as provided in Section 12940 of the California Government Code. Every Contractor for Public Works violating the provisions of Section 1735 of the California Labor Code is subject to all the penalties imposed for a violation of Chapter 1, Part 7, Division 2 of the California Labor Code.

30.13 Child Support Compliance. In accordance with California Public Contract Code Section 7110, CONTRACTOR and any and all SUBCONTRACTORS recognize the importance of child and family support obligations and shall fully comply with all applicable state and federal laws relating to child and family support enforcement, including, but not limited to, disclosure of information and compliance with earnings assignment orders, as provided in Chapter 8 (commencing with Section 5200) of Part 5 of Division 9 of the California Family Code; and, CONTRACTOR and SUBCONTRACTORS, to the best of their knowledge, are fully complying with the earnings assignment orders of all employees and is/are providing the names of all new employees to the New Hire Registry maintained by the California Employment Development Department.

ARTICLE 31 PERFORMANCE AND PAYMENT BONDS

31.01 Required bonds and amounts. Contractor shall furnish a Surety Bond in an amount equal to one hundred percent (100%) of the Contract Sum as security for faithful performance of this Contract (“Performance Bond”) and shall furnish a separate Surety Bond in an amount at least equal to one hundred percent (100%) of the Contract Sum as security for the payment of all persons performing labor and furnishing materials in connection with the Contract (“Payment Bond”). Both the Performance Bond and the Payment Bond must be executed by an admitted surety insurer. The form of these bonds shall be as set forth in these Contract Documents.

ARTICLE 32 INDEMNIFICATION AND INSURANCE

32.01 Indemnification. Contractor shall indemnify, defend, and hold harmless County, and officers, agents, and employees from and against any and all Claims, liabilities, and losses whatsoever (including damages to property and injuries to or death of persons, court costs, and reasonable attorneys’ fees) occurring or resulting to any and all persons, firms, or corporations furnishing or supplying Work, services, materials, or supplies in connection with the performance of this Contract, and from any and all Claims, liabilities, and losses occurring or resulting to any person, firm, or corporation for damage, injury, or death arising out of or connected with Contractor’s performance of this Contract, unless such Claims, liabilities, or losses arise out of the sole negligence or willful misconduct of County. “Contractor’s performance” includes Contractor’s action or inaction and the action or inaction of Contractor’s officers, employees, agents, and Subcontractors.

32.02 Evidence of Coverage.

A. Prior to commencement of this Contract, Contractor shall provide a “Certificate of Insurance” to the Construction Manager for transmittal to County with a copy to the Architect prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance certifying that coverage as required herein has been obtained. Individual endorsements executed by the insurance carrier shall accompany the certificate. In addition, a certified copy of the policy or policies shall be provided by Contractor upon request.

B. Contractor shall not receive a “Notice to Proceed” with the Work under this Contract until it has

obtained all insurance required and such insurance has been approved by County. This approval of insurance shall neither relieve nor decrease the liability of Contractor.

32.03 Qualifying Insurers. All Coverages, except Surety, shall be issued by companies which hold a current policyholder's alphabetic and financial size category rating of not less than A-VII, according to the current Best Key Rating Guide or a company of equal financial stability that is approved by County Contracts/Purchasing Manager.

32.04 General insurance requirements. Without limiting Contractor's duty to indemnify, Contractor shall maintain in effect throughout the term of this Contract a policy or policies of insurance with the following minimum limits of liability:

32.04.1. Commercial General Liability Insurance, including, but not limited to, premises and operations, including coverage for Bodily Injury and Property Damage, Personal/Advertising Injury, Contractual Liability, Broadform Property Damage, Independent Contractors, Products and Completed Operations, and with a ten (10) year Products and Completed Operations extension, with limits as follows:

General Aggregate (Reinstates Annually)	\$ 4,000,000
Products/ Completed Operations Aggregate	\$ 4,000,000
Personal/ Advertising Injury	\$ 2,000,000
Each Occurrence Limit	\$ 2,000,000

32.04.2. Builders Risk/Course of Construction Insurance, covering the entire Work at the Site to the full insurable value thereof. This insurance shall include the interests of the County, Contractor, and all Subcontractors in the Work and shall insure against the perils of fire, extended coverage, builder's risk, vandalism, and malicious mischief.

32.04.3. Business Automobile Liability Insurance, covering all motor vehicles, including owned, leased, non-owned, and hired vehicles, used in providing services under this Agreement, with a combined single limit for Bodily Injury and Property Damage of not less than \$1 Million (\$1,000,000) per occurrence.

32.04.4. Workers' Compensation Insurance, if Contractor employs others in the performance of this Contract, in accordance with California Labor Code Section 3700 and with Employer's Liability limits not less than \$1 Million (\$1,000,000) each person, \$1 Million (\$1,000,000) each accident, and \$1 Million (\$1,000,000) each disease.

32.04.5. Professional Liability Insurance, if required for the professional services being provided, (e.g., those persons authorized by a license to engage in a business or profession regulated by the California Business and Professions Code), in the amount of not less than \$1 Million (\$1,000,000) per Claim and \$2 Million (\$2,000,000) in the aggregate, to cover liability for malpractice or errors or omissions made in the course of rendering professional services. If professional liability insurance is written on a "Claims-made" basis rather than an occurrence basis, Contractor shall, upon the expiration or earlier termination of this Contract, obtain extended reporting coverage ("tail coverage") with the same liability limits. Any such tail coverage shall continue for at least three (3) years following the expiration or earlier termination of this Contract.

32.04.6. Excess Liability Insurance (over commercial general liability) of not less than combined

single limit \$10 Million (\$10,000,000), General Aggregate \$10 Million (\$10,000,000) and Products and Completed Operations Aggregate \$10 Million (\$10,000,000), and with a ten (10) year Products and Completed Operations extension.

32.05 Subcontractor Insurance Requirements. Without limiting Contractor's duty to indemnify, Contractor shall also require all Subcontractors to maintain in effect throughout the term of this Contract all Commercial General Liability Insurance, Builders Risk/Course of Construction Insurance, Business Automobile Liability Insurance, Workers' Compensation Insurance, Professional Liability Insurance, and Excess Liability Insurance described in Section 32.04 General insurance requirements. above, except that the minimum limits of General Liability Insurance shall be at least a combined single limit for Bodily Injury and Property Damage of not less than \$1 Million (\$1,000,000) per occurrence, general aggregate limits of not less than \$2 Million (\$2,000,000), limits for Products and Completed Operations of not less than \$2 Million (\$2,000,000) aggregate and \$1 Million (\$1,000,000) per occurrence, and limits for Personal/Advertising Injury of not less than \$1 Million (\$1,000,000) per occurrence and aggregate.

32.06 Other insurance requirements.

A. All insurance required by this Contract shall be with a company acceptable to the County and issued and executed by an admitted insurer authorized to transact Insurance business in the State of California. Unless otherwise specified by this Contract, all such insurance shall be written on an occurrence basis, or, if the policy is not written on an occurrence basis, such policy with the coverage required herein shall continue in effect for a period of three (3) years following the date Contractor completes its performance of services under this Contract.

B. Each liability policy shall provide that the County shall be given notice, in writing, at least thirty (30) days in advance of any endorsed reduction in coverage or limit, cancellation, or intended non-renewal thereof. Each policy shall provide coverage for Contractor and additional insureds with respect to Claims arising from each Subcontractor, if any, performing Work under this Contract, or be accompanied by a certificate of insurance from each Subcontractor showing each Subcontractor has identical insurance coverage to the above requirements.

C. Commercial General Liability Insurance and Business Automobile Liability Insurance policies shall provide an endorsement naming the County of Monterey, its officers, agents, and employees as Additional Insureds with respect to liability arising out of Contractor's Work, including ongoing and completed operations, and shall further provide that such insurance is primary insurance to any insurance or self-insurance maintained by the County and that the insurance of the Additional Insureds shall not be called upon to contribute to a loss covered by the Contractor's insurance. The required endorsement form for Commercial General Liability Additional Insured is **ISO Form CG 20 10 11-85 or CG 20 10 10 01 in tandem with CG 20 37 10 01 (2000).** The required endorsement form for Business Automobile Liability Additional Insured endorsement is **ISO Form CA 20 48 02 99.**

D. Prior to the execution of this Contract by the County, Contractor shall file certificates of insurance with County's Contract administrator and County Contracts/Purchasing Division, showing that Contractor has in effect the insurance required by this Contract. The Contractor shall file a new or amended certificate of insurance within five (5) calendar days after any change is made in any insurance policy which would alter the information on the certificate then on file. Additionally, Contractor shall provide certificates for Subcontractors of any tier in compliance with these provisions. Acceptance or approval of insurance shall in no way modify or change the indemnification clause in this Contract, which shall continue in full force and effect.

E. Contractor shall at all times during the term of this Contract maintain in force the insurance coverage required under this Contract and shall send, without demand by County, annual certificates to County's Contract Administrator and County Contracts/Purchasing Division. If the certificate is not received by the expiration date, County shall notify Contractor and Contractor shall have five (5) calendar days to send in the certificate, evidencing no lapse in coverage during the interim. Failure by Contractor to maintain such insurance is a default of this Contract which entitles County, at its sole discretion, to terminate this Contract immediately.

32.07 Acknowledgment of workers' compensation requirements. As required by Labor Code Section 1861, Contractor and each Subcontractor shall, before commencing Work on the Project, sign and file with the County, the following certificate:

"I am aware of the provisions of Section 3700 of the 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 the Labor Code, and I will comply with such provisions before commencing the performance of the Work of this contract."

32.08 Compliance. In the event of the failure of Contractor to furnish and maintain any insurance required by this Section, County, Construction Manager, or Architect shall have the right to take out and maintain such insurance for and in the name of Contractor. Contractor shall pay the cost thereof and shall furnish all information necessary to obtain and maintain such insurance for the account of Contractor. County, Construction Manager, and Architect shall each have the right to offset the costs of obtaining and maintaining such insurance against any amounts due Contractor under the Contract Documents. Compliance by Contractor with the requirement to carry insurance and furnish certificates or policies evidencing the same contained in this Article 32 shall not relieve Contractor from liability assumed under any provision of the Contract Documents, including, without limitation, the obligation to defend and indemnify each of the Indemnities.

32.09 Application of Insurance Proceeds.

(a) In the event of any damage to or destruction of the Work from any cause insured against by the insurance required under this Article 32, or any other insurance obtained by Contractor or any other source, County may, in its sole discretion, either (i) require Contractor to repair any such damage or destruction and reconstruct the Work in accordance with the Contract Documents, and Contractor agrees to perform any such requirement of Architect, or (ii) terminate the Contract and Contractor shall have no Claim arising out of such termination. In the event the Work is repaired or reconstructed, appropriate adjustments, if any, in the amount of the Contract Sum or for the time of completion of the Work shall be made by Change Order. County shall be given credit against any amount due Contractor under the Contract Documents for the amount of any insurance proceeds collected by Contractor to the extent such proceeds cover costs otherwise payable by County under the Contract Documents. In the event that County decides not to restore or reconstruct the Work and terminates the Contract, Contractor shall receive from the insurance proceeds all amounts due Contractor under the Contract for that portion of the Work completed as of the date of the event of damage or destruction.

(b) In the event of any damage to or destruction of the Work (i) not due to or arising out of the fault or neglect of Contractor or any Subcontractor and (ii) from a cause not insured against by the insurance required under this Article 32, County may, in its sole discretion, either (i) require Contractor to repair any such damage or destruction and reconstruct the Work in accordance with the Contract Documents, and Contractor agrees to perform any such requirements of Architect, or (ii) terminate the Contract. In the event County decides not to restore or reconstruct the Work in accordance with the Contract

Documents and causes termination of the Contract, Contractor shall have no Claim arising out of such termination. In the event that Work is repaired or reconstructed, appropriate adjustments, if any, in the amount of the Contract Sum and for the Time of completion of the Work shall be made by Change Order. County shall be given credit against any amount due Contractor under the Contract Documents to the extent insurance proceeds payable to Contractor cover costs otherwise payable by County under the Contract Documents. In the event that County decides not to restore or reconstruct the Work and causes termination of this Contract, County shall pay Contractor, as its sole compensation, all amounts due under the Contract Documents for the portion of the Work completed as of the date of the event of damage or destruction. Contractor shall be solely responsible for and shall, without cost or expense to County, promptly and with all due diligence, restore and reconstruct any uninsured loss or damage to the Work which occurs as a result of any fault or neglect of Contractor or any Subcontractor. This obligation is in addition to County's remedies under the Contract Documents or by law.

ARTICLE 33 CLAIMS AND DISPUTE RESOLUTION

33.01 Prompt resolution of differences required. It is the intention of this Article that differences between the parties arising under and by virtue of this Contract be brought to the attention of Construction Manager and Architect at the earliest possible time in order that such matters may be promptly settled, if possible, or other appropriate action may be taken promptly. To that end, County and Contractor agree to attempt informal resolution of disputes prior to initiating the Claim process.

33.02 Contract interpretations/performance judging/decisions by Architect and Construction Manager.
(a) All Claims may be presented informally first to Architect. To the extent that resolution of the Claim does not involve an extension of time or additional payments, Architect may resolve, in writing, or otherwise, Claims that have been presented informally.

(b) The Architect will be, in the first instance, the interpreter of the requirements of the Contract Documents and the judge of performance thereunder by both County and Contractor. The Architect will, within a reasonable time, render such interpretations, as Construction Manager may deem necessary for the proper execution or progress of the Work. Claims, disputes, and other matters in question between Contractor and County relating to the execution or progress of the Work or interpretation of the Contract Documents shall be referred initially to the Architect for decision which Architect will render, in writing, within a reasonable time. In Architect's capacity as interpreter and judge, Architect will exercise his or her best efforts to ensure faithful performance by both County and Contractor and will not show partiality to either. All interpretations and decisions of the Architect shall be consistent with the intent of the Contract Documents.

33.03 Obligation to Seek Informal Resolution Prior to Filing Claim for Disputed Work. Should it appear to Contractor that the Work to be performed or any of the matters relative to the Contract Documents are not satisfactorily detailed or explained therein, or should any questions arise as to the meaning or intent of the Contract Documents, or should any dispute arise regarding the true value of any Work performed, Work omitted, extra Work that the Contractor may be required to perform, time extensions, payment to the Contractor during performance of this Contract, performance of the Contract, and/or compliance with Contract procedures, or should Contractor otherwise seek extra time, compensation or payment FOR ANY REASON WHATSOEVER, then Contractor shall first follow procedures set forth in the Contract (including but not limited to other Articles of this Division 007100 and Section 01 2600.). If a dispute remains, then Contractor shall give written notice to County that expressly invokes this Article 33. County shall decide the issue in writing within fifteen (15) days; and County's written decision shall be final and conclusive.

33.04 Time for giving notice. Notice of dispute or potential Claim must be given in writing by the Contractor as follows:

- (a) For a potential Claim of an increase in the Contract Sum, Contractor shall give the Architect written notice thereof within ten (10) days after the occurrence of the event giving rise to such Claim; in addition, this notice shall be given by Contractor before proceeding to execute the portion of the Work to which the Claim relates, except in an emergency endangering life or property, and except where Contractor could not reasonably have discovered the facts giving rise to the Claim prior to commencement of that portion of the Work.
- (b) For a potential Claim of an extension of time, Contractor shall give written notice to the Construction Manager no more than ten (10) days after the occurrence of the delay; otherwise they shall be waived. In the case of a continuing cause of delay, only one (1) Claim is necessary.
- (c) In all other cases, notice shall be given within ten (10) days after the happening of the event, thing, or occurrence giving rise to the potential Claim.

33.05 Form and Contents of Claim. If Contractor disagrees with County's decision, or if Contractor contends that County failed to provide a decision timely, then Contractor's SOLE AND EXCLUSIVE REMEDY is to promptly file a written Claim setting forth Contractor's position as required herein. The Claim shall be submitted to County within thirty (30) calendar days of receiving County's written decision, or the date Contractor contends such decision was due. The Contractor shall furnish reasonable documentation to support the Claim. Contractor's written Claim must identify itself as a "Claim" under this Article 33 and must include the following: (1) a narrative of pertinent events; (2) citation to contract provisions; (3) theory of entitlement; (4) complete pricing of all cost impacts; (5) a time impact analysis of all time delays that shows actual time impact on the critical path; and (6) documentation supporting items (1) through (5). The Claim must be verified under penalty of perjury by Contractor's Project Superintendent as to the Claim's accuracy, and shall be priced like a Change Order, and must be updated monthly as to cost and entitlement if a continuing Claim. The Claim must be sent by registered mail or certified mail with return receipt requested to the County per Article 7, Notices, of the Agreement. Routine contract materials, for example, correspondence, RFI, Change Order requests, or payment requests shall not constitute a Claim. Contractor shall bear all costs incurred in the preparation and submission of a Claim.

33.06 Actions by County Upon Receipt of Claim.

- (a) Upon receipt of a Claim, the County shall conduct a reasonable review of the Claim and, within a period not to exceed forty-five (45) days, shall provide the Contractor a written statement identifying what portion of the Claim is disputed and what portion is undisputed.
- (b) The County and the Contractor may, by mutual agreement, extend the time period provided in this Article.
- (c) If the County needs approval from the Board of Supervisors to provide the Contractor a written statement identifying the disputed portion and the undisputed portion of the Claim, and the Board does not meet within the forty-five (45) days or within the mutually agreed to extension of time following receipt of a Claim sent by registered mail or certified mail, return receipt requested, the County shall have up to three (3) days following the next duly publicly noticed meeting of the governing body after the forty-five (45) day period, or extension, expires to provide the Contractor a written statement identifying the disputed portion and the undisputed portion.

33.07 Written Statement by County. Any payment due on an undisputed portion of the Claim shall be processed and made within sixty (60) days after the County issues its written statement. Failure by the County to issue a written statement shall result in the Claim being deemed rejected in its entirety. A

Claim that is denied by reason of the County's failure to have responded to a Claim, or its failure to otherwise meet the time requirements of this Article 33, shall not constitute an adverse finding with regard to the merits of the Claim or the responsibility or qualifications of the Contractor.

33.08. Contractor's Dispute of Written Response. If the Contractor disputes the County's written response, or if the County fails to respond to a Claim issued pursuant to this Article within the time prescribed, the Contractor may demand in writing an informal conference to meet and confer for settlement of the issues in dispute. Upon receipt of a demand in writing sent by registered mail or certified mail, return receipt requested, the County shall schedule a meet and confer conference within thirty (30) days for settlement of the dispute.

33.09. Written Statement by County After Meet and Confer Conference. Within ten (10) business days following the conclusion of the meet and confer conference, if the Claim or any portion of the Claim remains in dispute, the County shall provide the Contractor a written statement identifying the portion of the Claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the Claim shall be processed and made within sixty (60) days after the County issues its written statement.

33.10. Nonbinding Mediation.

(a) Any disputed portion of the Claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation, with the County and the 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.

(b) Mediation includes any nonbinding process, including, but not limited to, neutral evaluation or a dispute review board, in which an independent third party or board assists the parties in dispute resolution through negotiation or by issuance of an evaluation. Any mediation utilized shall conform to the timeframes in this Article.

(c) If mediation is unsuccessful, the parts of the Claim remaining in dispute shall be subject to applicable procedures outside this Article.

(d) Unless otherwise agreed to by the County and the Contractor in writing, the mediation conducted pursuant to this Article shall excuse any further obligation under Section 20104.4 of the Public Contract Code to mediate after litigation has been commenced.

(e) The Claim resolution procedures in this Article do not preclude the County from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this Article does not resolve the parties' dispute.

33.11 Claims by Subcontractors. If a Subcontractor or a lower tier Subcontractor lacks legal standing to assert a Claim against the County because privity of contract does not exist, 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/her/its 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 by a lower tier Subcontractor on behalf of the Subcontractor. The Subcontractor requesting that the Claim be presented to the public entity shall furnish reasonable documentation to support the Claim. Within forty-five (45) days of receipt of this written request, the Contractor shall notify the Subcontractor in writing as to whether the Contractor presented the Claim to the County and, if the original Contractor did not present the Claim, provide the Subcontractor with a statement of the

reasons for not having done so.

33.12 Prompt response when needed. Whenever it appears that a prompt response is essential, County will respond to Claims sooner than the limits prescribed above.

33.13 Compliance.

(a) The provisions of this Article constitute a non-judicial Claim settlement procedure that, pursuant to Section 930.2 of the California Government Code, shall constitute a condition precedent to submission of a valid Claim under the California Government Code. Contractor shall bear all costs incurred in the preparation, submission and administration of a Claim. Any Claims presented in accordance with the Government Code must affirmatively indicate Contractor's prior compliance with the Claims procedure herein and the previous dispositions of the Claims asserted. Pursuant to Government Code Section 930.2, the one (1) year period in Government Code Section 911.2 shall be reduced to one hundred and fifty (150) days from either accrual of the cause of action, substantial completion or termination of the contract, whichever occurs first; in all other respects, the Government Code shall apply unchanged.

(b) Failure to submit and administer Claims as required in Article 33 shall waive Contractor's right to Claim on any specific issues not included in a timely submitted Claim. Claim(s) or issue(s) not raised in a timely protest and timely Claim submitted under this Article 33 may not be asserted in any subsequent litigation, Government Code Claim, or legal action.

(c) County shall not be deemed to waive any provision under this Article 33, if at County's sole discretion, a Claim is administered in a manner not in accord with this Article 33. Waivers or modifications of this Article 33 may only be made through a signed Change Order approved as to form by legal counsel for both County and Contractor; oral or implied modifications shall be ineffective.

33.14 Filing of Government Code claims. If the Contractor still remains unsatisfied and desires to preserve his/her/its right to pursue the matter further, Contractor must then file a claim with County, pursuant to Government Code Sections 900 et seq. or Sections 910 et seq.

33.15 Civil action. If the Government Code claim is denied, Contractor may file an action in court. Such action shall be subject to Public Contract Code Sections 9204 or 20104.4. This Section applies only to claims subject to Public Contract Code Sections 9204 or 20104. If a claim is not subject to Public Contract Code Sections 9204 or 20104, the Contractor's right to file a civil action shall be as otherwise provided by law.

33.16 Claims for damages. Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party or of any of his/her/its employees, agents, or others for whose acts he/she/it is legally liable, Claim shall be made, in writing, to such other party within a reasonable time after the first observance of such injury or damage, provided that in no case may such a Claim be filed after expiration of any applicable statute of limitations for filing such a Claim. Claims against County that are subject to this Article shall comply with all procedures set forth in the California Government Code concerning claims against public entities.

33.17 Consistency with Public Contract Code Sections 9204 and 20104 et seq. If any Claim arising under this Contract is subject to the provisions of Public Contract Code Sections 9204 or 20104 et seq. (Division 2, Part 3, Chapter 1, Article 1.5), and if provisions of that Article require a procedure or procedural element different from that established in this Contract, then the provisions of that Article shall apply in place of the conflicting procedure or procedural element established herein.

ARTICLE 34 DEFAULT AND TERMINATION OF THE CONTRACT

34.01 Suspension Of Work. Owner may, without cause, order Contractor in writing to suspend, delay or interrupt Work in whole or in part for such period of time as Owner may determine. An adjustment shall be made for increases in cost of performance of Work of the Contract Documents caused by any such suspension, delay or interruption, calculated using the measures set forth in the Modification Procedures Section. No adjustment shall be made to extent that performance is, was or would have been so suspended, delayed or interrupted by another cause for which Contractor is responsible.

34.02 County's right to stop Work. If Contractor fails to correct Defective Work or fails to supply materials or equipment in accordance with the Contract Documents, County may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated.

34.03 County's rights on Contractor's default. If Contractor fails to prosecute the Work diligently or fails to perform any provision of this Contract, County may, after seven (7) days written notice to Contractor and without prejudice to any other remedy, make good such deficiencies. In such case, any appropriate Change Order shall be issued deducting from the payments then or thereafter due Contractor, the cost of correcting such deficiencies, including the cost of Architect's, Construction Manager's, and other County Contractors' additional services made necessary by such default. Such Change Order shall not require the consent of Contractor to be effective. County, Construction Manager, and Architect must approve both such action and the amount charged to Contractor. If the payments then or thereafter due Contractor are not sufficient to cover such amount, Contractor shall pay the difference to County.

34.04 Termination by County.

A. County may terminate the performance of Contractor under this Contract, without prejudice to any other right or remedy County may have, in the manner hereinafter provided, upon certification by Construction Manager that the following circumstances have arisen:

1. Contractor is adjudged bankrupt, or makes a general assignment for the benefit of his/her/its creditors, or a receiver is appointed on account of his/her/its insolvency (except as provided in Subsection (E) below);
2. Contractor refuses or fails, except in cases for which an extension of time is provided, to supply enough properly skilled workers or proper materials;
3. Contractor fails to make prompt payment to Subcontractors, to suppliers of materials or equipment, or to employees;
4. Contractor disregards laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction; or
5. Contractor otherwise is guilty of a substantial violation of the Contract.

B. To terminate the performance of Contractor, County shall first give ten (10) days written notice to Contractor and Contractor's Surety, if any, stating County's intent to terminate the performance of Contractor unless within ten (10) days the grounds for such termination have been removed, and giving County's reasons therefore.

C. If within ten (10) days the grounds for termination are not removed, County may immediately terminate the performance of Contractor and shall promptly serve notice of termination on Contractor and the Surety. The Surety shall have the right to take over and perform the Contract, provided that, within fifteen (15) days after service upon it of said notice of termination, the Surety must first give written notice to County that it intends to take over and perform the Contract, and within thirty (30) days after service upon it of said notice of termination, the Surety must commence performance of the Contract. If Surety fails to take either of these steps in a timely manner, County may immediately

take possession of the Site and all materials, equipment, tools, construction equipment, and machinery thereon owned by Contractor and may finish the Work by whatever method it may deem expedient.

D. If within ten (10) days of County's notice of intent to terminate, the grounds for termination are not removed, Contractor shall not be entitled to receive any further payment until the Work is finished. If, upon completion of the Work by County, the unpaid balance of the Contract Sum exceeds the costs of finishing the Work (including compensation for additional architectural, managerial, and administrative services), such excess shall be paid to Contractor. If such costs exceed such unpaid balance, Contractor or Contractor's Surety shall pay the difference to County. The costs incurred by County as herein provided shall be certified by Construction Manager.

E. Notwithstanding the foregoing, performance of Contractor under this Contract may not be terminated, and this Contract may not be modified, where a trustee in bankruptcy has assumed this Contract pursuant to 11 U.S.C. Section 365.

F. In the event a termination for cause is later determined to have been made wrongfully or without cause, then the termination shall be treated as a termination for convenience, and the Contractor shall have no greater rights than it would have had following a termination for convenience. Any Contractor Claim arising out of a termination for cause shall be made in accordance with Article 33 herein. No other loss, cost, damage, expense or liability may be claimed, requested or recovered by the Contractor.

34.05 Termination by Contractor.

(a) Contractor may, upon seven (7) days written notice to County, Architect, and Construction Manager, terminate the Contract if the Work is stopped for a period of forty-five (45) days under an order of any court or other public authority having jurisdiction, or as a result of an act of government, such as a declaration of a national emergency making materials unavailable, through no act or fault of Contractor or a Subcontractor or their agents or employees or any other person performing any of the Work under a Contract with Contractor.

(b) To terminate the Contract, Contractor must give written notice to County, Construction Manager, and Architect of such termination, stating the reasons therefore.

(c) Contractor may then recover from County payment for all Work executed, for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery, for lost profits, and for all other damages suffered by Contractor on account of such stoppage of Work.

34.06 Termination for Convenience of County.

(a) The performance of Work under this Contract may be terminated by County in whole, or in part, whenever County shall determine that termination is in the best interest of County. Any such termination shall be effected by delivery to Contractor of a Notice of Termination specifying the extent to which performance of Work under this Contract is terminated, and the date upon which such termination becomes effective.

(b) After receipt of a Notice of Termination, and except as otherwise directed by County, Contractor shall:

1. Stop Work under this Contract on the date and to the extent specified in the Notice of Termination;
2. Place no further orders or Subcontracts for materials, services, or facilities except as may be necessary for completion of such portion of the Work under this Contract as is not terminated;
3. Terminate all orders and Subcontracts to the extent that they relate to the performance of Work terminated by the Notice of Termination;
4. Settle all outstanding liabilities and all Claims arising out of such termination of orders and Subcontracts, subject to the approval of County;
5. Complete performance of such part of the Work as shall not have been terminated by the Notice of

Termination; and

6. Take such action as may be necessary, or as County may direct, for the protection and preservation of the property related to this Contract which is in the possession of Contractor and in which County has, or may acquire, an interest.

(c) After receipt of a Notice of Termination, Contractor shall submit to County a verified termination Claim. Such Claim shall be submitted promptly, but in no event later than thirty (30) days from the effective date of termination, unless one (1) or more extensions, in writing, are granted by County upon request of Contractor made, in writing, within such period or authorized extension of the period.

(d) Contractor and County may agree upon the whole or any part of the amount or amounts to be paid to Contractor by reason of the total or partial termination of Work pursuant to this article, which amount or amounts may include a reasonable allowance for profit on Work done; provided that total Contract Sum as reduced by the amount of payments otherwise made and as further reduced by Contract Sum of Work not terminated does not exceed the Contract Sum.

34.07 Contingent Assignment Of Subcontracts

A. Contractor hereby assigns to Owner each Subcontract for a portion of the Work, provided that:

1. The assignment is effective only after Owner's termination of Contractor's right to proceed under the Contract Documents (or portion thereof relating to that Subcontract) as set forth herein.

2. The assignment is effective only for the Subcontracts which Owner expressly accepts by notifying the Subcontractor in writing;

3. The assignment is subject to the prior rights, if any, of the Surety, obligated by Division 006000 (Performance Bond) provided under the Contract Documents, where the Surety exercises its rights to complete the Contract;

4. After the effectiveness of an assignment, Contractor shall, at its sole cost and expense (except as otherwise provided in this Division 007100), sign all instruments and take all actions reasonably requested by Owner to evidence and confirm the effectiveness of the assignment in Owner; and

5. Nothing in this Section shall modify or limit any of Contractor's obligations to Owner arising from acts or omissions occurring before the effectiveness of any Subcontract assignment, including but not limited to all defense, indemnity and hold-harmless obligations arising from or related to the assigned Subcontract.

34.08 Limit Of Liability

A. OWNER, AND EACH OF ITS OFFICERS, BOARD MEMBERS, EMPLOYEES, CONSULTANTS AND AGENTS INCLUDING, BUT NOT LIMITED TO, PROJECT MANAGER AND ALL OTHER OWNER REPRESENTATIVES, SHALL HAVE NO LIABILITY TO CONTRACTOR FOR SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, EXCEPT TO THE LIMITED EXTENT THAT THESE CONTRACT DOCUMENTS OR APPLICABLE PUBLIC CONTRACTING STATUTES MAY SPECIFY THEIR RECOVERY.

ARTICLE 35 WARRANTIES

35.01 Warranty And Guaranty

A. General Representations and Warranties: Contractor represents and warrants that it is and will be at all times fully qualified and capable of performing every Phase of the Work and to

complete Work in accordance with the terms of Contract Documents. Contractor warrants that all construction services shall be performed in accordance with generally accepted professional standards of good and sound construction practices and all requirements of Contract Documents. Contractor warrants that Work, including but not limited to each item of materials and equipment incorporated therein, shall be new, of suitable grade of its respective kind for its intended use, and free from defects in engineering, materials, construction and workmanship. Contractor warrants that Work shall conform in all respects with all applicable requirements of federal, state and local laws, applicable construction codes and standards, licenses, and permits, Drawings and Specifications and all descriptions set forth therein, and all other requirements of Contract Documents. Contractor shall not be responsible, however, for the negligence of others in the specification of specific equipment, materials, design parameters and means or methods of construction where that is specifically shown and expressly required by Contract Documents.

B. **Extended Guarantees:** Any guarantee exceeding one (1) year provided by the supplier or manufacturer of any equipment or materials used in the Project shall be extended for such term. Contractor shall supply Owner with all warranty and guarantee documents relative to equipment and materials incorporated in the Project and guaranteed by their suppliers or manufacturers.

C. **Environmental and Toxics Warranty:** The covenants, warranties and representations contained in this Section are effective continuously during Contractor's Work on the Project and following cessation of labor for any reason including, but not limited to, Project completion. Contractor covenants, warrants and represents to Owner that:

1. To Contractor's knowledge after due inquiry, no lead or asbestos containing materials were installed or discovered in the Project at any time during Contractor's construction thereof. If any lead or asbestos containing materials were discovered, Contractor made immediate written disclosure to Owner.

2. To Contractor's knowledge after due inquiry, no electrical transformers, light fixtures with ballasts or other equipment containing PCBs are or were located on the Project at any time during Contractor's construction thereof.

3. To Contractor's knowledge after due inquiry, no storage tanks for gasoline or any other toxic substance are or were located on the Project at any time during Contractor's construction thereof. If any such materials were discovered, Contractor made immediate written disclosure to Owner.

4. Contractor's operations concerning the Project are and were not in violation of any applicable environmental federal, state, or local statute, law or regulation dealing with hazardous materials substances or toxic substances and no notice from any governmental body has been served upon Contractor claiming any violation of any such law, ordinance, code or regulation, or requiring or calling attention to the need for any Work, repairs, construction, alteration, or installation on or in connection with the Project in order to comply with any such laws, ordinances, codes, or regulations, with which Contractor has not complied. If there are any such notices with which Contractor has complied, Contractor shall provide Owner with copies thereof.

35.02 Title free of liens at time of each progress payment. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by an application for payment, whether incorporated in the Project or not, will pass to County upon the receipt of such payment by Contractor, free and clear of all liens, Claims, security interests, or encumbrances.

35.03 Warranty as to liens. No materials, supplies, or equipment for Work under this Contract 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 materials, supplies, and equipment installed or incorporated in the Work and agrees upon completion of all Work to deliver the premises, together with all Improvements

and appurtenances constructed or placed thereon by Contractor, to County free from Claims, liens, or charges. Contractor further agrees that neither Contractor, nor any person, firm, or corporation furnishing any materials or labor for any Work covered by this Contract, shall have any right to any lien upon the premises or any Improvement or appurtenance thereon. Nothing contained in this article, however, shall defeat or impair the right of persons furnishing material or labor under any Bond given Contractor for their protection or any rights under any law permitting such persons to look to funds due Contractor in the hands of County, and this provision shall be inserted in all Subcontracts and material Contracts and notice of its provisions shall be given to all persons furnishing material for Work when no formal Contract is entered into for such material.

35.04 Other warranties. In addition to the warranties in the Contract Documents, Contractor shall assign to County through Architect all assignable warranties it obtains from manufacturers or suppliers with respect to any materials, equipment, or fixtures incorporated into the Work, but the assignment shall not relieve Contractor of any of its guaranties or obligations. Contractor's guaranties and the Contract Documents shall not act as a bar to Contractor's liability for any third-party Claim against Contractor, and are in addition to, not exclusive of, Contractor's other obligations under the Contract Documents, including, without limitation, Contractor's obligation to indemnify and defend County and Architect.

35.05 No limitations. Nothing in this Article 35 shall be construed to establish a period of limitation with respect to any latent or patent defects in the Work or Claims or liabilities arising therefrom. The establishment of time periods relates only to the specific obligation of Contractor to correct or cause correction of the Work, and has no relationship to the time within which its obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish Contractor's liability with respect to its obligations under the Contract Documents or in connection with the Work.

PART VII MISCELLANEOUS

ARTICLE 36 MISCELLANEOUS PROVISIONS

36.01 Audits. If this Contract involves the expenditure of public funds in excess of \$10,000, the contracting parties shall be subject to the examination and audit in accordance with applicable local, state, and federal regulations and the State Auditor of the State of California for a minimum period of three (3) years after final payment under the Contract, as required by Government Code Section 8546.7. The examination and audit shall be confined to those matters connected with the performance of the Contract, including, but not limited to, the costs of administering the Contract.

With respect to any Change in the Work, other than based on an agreed lump sum price, resulting in an increase in the Contract Sum or extension of the Contract Time, Contractor shall cause its Subcontractors and Sub-subcontractors to afford access to County at all reasonable times to any books, correspondence, instructions, receipts, vouchers, memoranda, and records of any kind relating thereto, all of which each of them shall maintain for a period of at least three (3) years from and after the date County makes final payment on account of such Change in the Work. Contractor and its Subcontractors and Sub-subcontractors shall make the same available within three (3) calendar days following notification to Contractor of County's intent to audit, failing which Contractor's Claim for an increase in the Contract sum and/or extension of the Contract Time, as applicable, shall be disallowed, and Contractor shall have no recourse on account of such disallowance. Contractor authorizes County, and shall cause its Subcontractors and Sub-subcontractors to authorize County, to

check directly with any suppliers of labor and material with respect to any item chargeable to County under this Article, to confirm balances due and to obtain sworn statements and waivers of lien, all if County so elects.

36.02 Governing law. This Contract shall be governed by the law of the State of California.

36.03 No assignment. Neither party to this Contract shall assign this Contract without the written consent of the other, nor shall Contractor assign any monies due or to become due to him/her/it hereunder, without the previous written consent of County. Should any money due or to become due under this Contract be assigned, it shall be subject to a prior lien for services rendered or material supplied for performance of Work under this Contract in favor of all persons, firms, or corporations rendering such services or supplying such materials to the extent that Claims are filed pursuant to the Civil Code, the Code of Civil Procedure, and/or the Government Code.

36.04 Binding on successors and assigns. County and Contractor each binds himself/herself/itself, their partners, successors, assigns, and legal representatives to the other party hereto and to the partners, successors, assigns, and legal representatives of such other party in respect to all covenants, Agreements, and obligations contained in the Contract Documents.

36.05 Contractual rights and remedies not exclusive. The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights, and remedies, otherwise imposed or available by law, except as otherwise specified herein.

36.06 Assignment of antitrust causes of action. Contractor and all Subcontractors are bound by Public Contract Code Section 7103.5, which provides as follows:

In entering into a Public Works Contract or a Subcontract to supply goods, services, or materials pursuant to a Public Works Contract, Contractor or 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 USC Section 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 acknowledgment by the parties.

36.07 Royalties and patents. Contractor shall pay all royalties and license fees. Contractor shall defend all suits or Claims for infringement of any patent rights and shall save County, harmless from loss on account thereof, except that County shall be responsible for all such loss when a particular design, process, or the product of a particular manufacturer or manufacturers is specified but if the Contractor has reason to believe that the design, process, or product specified is an infringement of a patent, Contractor shall be responsible for such loss unless Contractor promptly gives such information to Architect through the Construction Manager.

36.08 Prohibited interests. No official 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 the Project, shall become directly or indirectly interested

financially in this Contract or in any part thereof. 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 of the Project shall become directly or indirectly interested financially in this Contract or in any part thereof.

36.09. No continuing waiver. A waiver of rights by County or Contractor in one (1) instance hereunder does not constitute a waiver of rights in any similar instance thereafter.

36.10 Taxable possessory interest. The terms of this instrument may result in the creation of a possessory interest. If such a possessory interest is vested in a private party to this instrument, the private party may be subjected to the payment of personal property taxes levied on such interest.

SUPPLEMENTARY CONDITIONS

(Division 007300)

The supplementary conditions below are included as part of the contract for the Project.

1. Starting and completion date. Under Article 12 of the General Conditions, Contractor shall commence and complete work within the following time limits:

The duration to execute the scope of work for the above project is Three Hundred Thirty (330) days as it pertains to Contractor's Scope of Work for base bid and accepted alternates defined by the Contract Documents. Additionally, Contractor shall coordinate its work with all other Contractors whose work is affected by the Scope of Work defined in this Agreement. Contractor expressly agrees to provide appropriate labor, material, and equipment in response to adjustments in the Project Schedule made by Architect and Construction Manager during the course of the Project in order to maintain the required progress.

2. Hours of work. Work will not commence earlier than 7:00 a.m. nor proceed past 5:00 p.m. without written consent of County.

3. Site access. The adjacent sites are occupied and active: County Services and Regional Occupation Program (ROP). Contractor shall secure project site with temporary fencing to ensure separation between business and construction activities.

4. Site restoration. All lawn, landscaping, pavement, and trees are to be protected from construction equipment and/or vehicles. Any compaction, gouging, tearing, removal, or dislocation of the existing lawn or trees that occurs during the staging and construction process is to be restored to preconstruction quality. Contractor's laydown area shall be restored back to original condition at completion of work activities.

5. Utilities, disruption of service. Contractor shall notify Construction Manager, in writing, two (2) workdays in advance of any disruption of service, e.g., fire suppression, electrical, water, and Contractor shall not proceed with the work without written authorization from Construction Manager .

6. Contractor parking. Contractor will be designated a staging area which can be used for delivery of materials and construction vehicles. Barricades must be placed showing Contractor's name to reserve the spaces when Contractor's vehicles are not at the site either during the day or overnight for the next morning.

7. Noise during construction. Not restricted within established Hours of Work

8. Liquidated damages. Pursuant to the Agreement and Article 12 of the General Conditions, the amount of liquidated damages shall be **Seven Hundred Fifty Dollars (\$750) per day.**

9. Agreement and bonds. Contractor will provide the specified number of originals for each of the following:

Four (4) Executed Contracts
One (1) Payment Bond

One (1) Performance Bond
One (1) Certificate of Liability Insurance with
Endorsements

10. Contract Documents furnished to Contractor. The number of originals of the Contract Documents to be provided under Article 3 of the General Conditions is as follows:

- One (1) fully executed Contract
- One (1) each Addendum
- One (1) Plans and Specifications

11. Supervision. Section 9.04 of the General Conditions require that Contractor employ a competent, qualified Superintendent to provide full time, on-site supervision of all aspects of the Work and further require that such Superintendent and Contractor's Project Manager be satisfactory to County. If Contractor fails to have such Superintendent on-site at any time during the progress of the Work, a penalty of One Thousand Dollars (\$1,000.00) per day shall be deducted from the compensation otherwise due to Contractor for each day on which such failure occurs. Such penalty shall not apply to temporary absences approved in advance by Architect or County.

12. Owner's representative Article 6 and 9. All coordination must be made with Construction Manager. All communication with Construction Manager must be made by Contractor's Superintendent or Contractor's Project Manager to maintain control and to prevent misunderstandings. All communication with Contractor and Construction Manager will be in writing.

13. Determining cost for Change Orders. Section 18.04 of the General Conditions designates the maximum markup(s) allowed by County.

14. Material Safety Data Sheets (MSDS). Article 17 and 20. MSDS sheets are required on-site for all materials used in the job.

15. As-built Drawings. Per General Conditions, Contractor will be required to maintain a current set of as-built Drawings throughout the duration of the Project. Upon final completion of the Project as outlined in Article 23 of the General Conditions, Contractor will be responsible to provide the close-out documents to Construction Manager as follows:

- One Half-size, complete as-built Drawing set showing all information from Contractor,
- (1) Subcontractor(s), and Sub-Subcontractor(s)
- Two CD's with complete as-built Drawings, Operations & Maintenance Manual, and
- (2) Warranty Certifications (with required contact names, addresses, and telephone numbers) in pdf format
- Two Printed Operation & Maintenance Manuals for all installed materials and equipment
- (2)
- Two Printed Warranty Certifications as noted in the Project Manual with required contact
- (2) names, addresses and phone numbers

16. Partnering. This Contract imposes an obligation of good faith and fair dealing in its performance and enforcement. County intends to encourage the foundation of a cohesive partnership with Contractor and its principal Subcontractors and suppliers. The objectives are effective and efficient Contract performance and completion within budget, on schedule, and in accordance with the Contract Documents.

17. Meetings. Contractor will be responsible for attending brief weekly meetings during this Contract. The meetings shall be attended by Contractor's Project Superintendent and/or Project

Manager and will be located on-site. Contractor shall bear the administrative costs of their attendance.

18. Submittal Schedule. Upon receipt of the Notice of Conditional Award letter, Contractor shall prepare and update it as necessary to maintain a current Submittal Schedule which will be due to Architect and Construction Manager no later than County's projected Notice to Proceed date as listed in County's overall Project Schedule. Contractor shall make revisions to the Submittal Schedule as deemed necessary by the Construction Manager to conform to the Project Schedule.

19. Permits. All required permits to start Project will be obtained by Construction Manager, but paid for directly by County. The Contractor shall secure and pay for other permits, fees, licenses and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after the execution of the Contract and legally required at the time bids are received or negotiations concluded.

20. Time Extension. No extension of time will be allowed for a schedule delay caused by Contractor's failure or neglect to construct and maintain all weather protection. No extension of time will be allowed for "normal" weather conditions for the particular time of the year.

21. Codes and Standards. Project shall conform to applicable requirements prescribed by governmental bodies having jurisdiction and in accordance with those listed on the drawings produced by the Architect, WESTON MILES ARCHITECTS, for this Project. Should any part of the design fail to comply with such requirements, the discrepancy shall be called to the attention of the Architect and Construction Manager as quickly as possible. Should there be any direct conflict between the drawings and/or specifications and the above rules and regulations, the rules and regulations shall take precedence. However, when the indicated materials, workmanship, arrangement, or construction is of a superior quality or capacity to that required by the listed rules and regulations, the drawings and/or specifications shall take precedence. The rulings and interpretations of enforcing agencies shall be considered as part of the regulations.

MONTEREY COUNTY
RESOURCE MANAGEMENT AGENCY

PUBLIC WORKS, PARKS & FACILITIES

VOLUME TWO OF TWO

PROJECT MANUAL

855 EAST LAUREL DRIVE-EMERGENCY SHELTER
PROJECT NO. 8875
BID NO. 10736



TABLE OF CONTENTS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 011000 - SUMMARY OF WORK
SECTION 012100 - PROJECT CONTROL SYSTEM
SECTION 012200 - UNIT PRICES: MEASUREMENT AND PAYMENT
SECTION 012600 - MODIFICATION PROCEDURES
SECTION 012613 - REQUESTS FOR INFORMATION
SECTION 013113 - PROJECT COORDINATION
SECTION 013119 - PROJECT MEETINGS
SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION: SCHEDULES &
REPORTS
SECTION 013300 - SUBMITTAL PROCEDURES
SECTION 017400 - CONSTRUCTION CLEANING AND WASTE MANAGEMENT
SECTION 017700 - CONTRACT CLOSEOUT PROCEDURES
SECTION 018119 - CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT

DIVISION 03 – CONCRETE

SECTION 031000 - CONCRETE FORMWORK
SECTION 033000 - CAST-IN-PLACE CONCRETE
SECTION 033923 - MEMBRANE CONCRETE CURING

DIVISION 05 – METALS

SECTION 054000 - COLD-FORMED METAL FRAMING
SECTION 055000 - METAL FABRICATIONS
SECTION 055200 - METAL RAILINGS

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

SECTION 061000 - ROUGH CARPENTRY
SECTION 061643 - GLASS-MAT GYPSUM SHEATHING
SECTION 062000 - FINISH CARPENTRY
SECTION 064116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS
SECTION 064196 - QUARTZ AGGLOMERATE COUNTERTOPS
SECTION 068200 - FIBERGLASS REINFORCED PLASTIC PANELS

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

SECTION 071000 - CONCRETE WATERPROOFING
SECTION 072116 - BLANKET INSULATION
SECTION 072200 - ROOF AND DECK INSULATION
SECTION 072600 - SURFACE APPLIED VAPOR RETARDER
SECTION 072616 - BELOW-GRADE VAPOR BARRIER
SECTION 076000 - FLASHING AND SHEET METAL
SECTION 079000 - SEALANTS AND CAULKING

DIVISION 08 - OPENINGS

SECTION 081100 - METAL DOORS, WINDOWS AND FRAMES
SECTION 081117 - PREFINISHED STEEL DOOR FRAMES
SECTION 081416 - FLUSH WOOD DOORS
SECTION 083300 - OVERHEAD COILING GRILLE
SECTION 085169 - GATE HARDWARE
SECTION 087100 - DOOR HARDWARE
SECTION 088100 - GLASS AND GLAZING

SECTION 000110 - TABLE OF CONTENTS

Project: 855 East Laurel Drive Emergency Shelter
Project No. 8875
Bid No. 10736

DIVISION 09 - FINISHES

SECTION 092900 - GYPSUM BOARD
SECTION 095100 - ACOUSTIC CEILINGS
SECTION 096500 - RESILIENT FLOORING
SECTION 096800 - CARPET TILE
SECTION 096810 - RUBBER BASE
SECTION 097813 - STAINLESS STEEL WALL PANELS
SECTION 099100 - PAINTING
SECTION 099565 - EPOXY COATINGS

DIVISION 10 - SPECIALTIES

SECTION 101010 - KITCHEN EQUIPMENT
SECTION 101100 - VISUAL DISPLAY UNITS
SECTION 101400 - SIGNAGE
SECTION 102113 - SOLID PLASTIC TOILET COMPARTMENTS
SECTION 102119 - SOLID PLASTIC SHOWER AND DRESSING COMPARTMENTS
SECTION 102613 - CORNER GUARDS
SECTION 102813 - TOILET ACCESSORIES
SECTION 104413 - FIRE EXTINGUISHER CABINETS
SECTION 104416 - FIRE EXTINGUISHERS
SECTION 105126 - SOLID PLASTIC LOCKERS AND BENCHES

DIVISION 11 - FURNISHINGS

SECTION 115213 - PROJECTION SCREENS

DIVISION 13 - SPECIAL CONSTRUCTION

SECTION 133419 - METAL BUILDING SYSTEMS

DIVISION 22 - PLUMBING

SECTION 220000 - PLUMBING

DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING

SECTION 230500 - COMMON WORK RESULTS FOR HVAC
SECTION 230553 - IDENTIFICATION FOR HVAC
SECTION 230593 - TESTING ADJUSTING & BALANCING
SECTION 230713 - DUCT INSULATION
SECTION 230719 - HVAC PIPING INSULATION
SECTION 230900 - INSTRUMENTATION & CONTROLS
SECTION 232300 - REFRIGERANT PIPING
SECTION 233113 - METAL DUCTS
SECTION 233300 - AIR DUCT ACCESSORIES
SECTION 233423 - POWER VENTILATORS
SECTION 233713 - DIFFUSERS REGISTERS GRILLES
SECTION 238126 - VRV HEAT PUMP
SECTION 238127 - VRV HEAT RECOVERY
SECTION 238128 - VRV FAN COILS

DIVISION 26 - ELECTRICAL

SECTION 260500 - GENERAL ELECTRICAL REQUIREMENTS
SECTION 260519 - LINE VOLTAGE WIRE AND CABLE
SECTION 260526 - GROUNDING

SECTION 260533 - OUTLET, JUNCTION AND PULL BOXES
SECTION 260542 - CONDUITS, RACEWAYS AND FITTINGS
SECTION 260543 - UNDERGROUND DUCTS
SECTION 260544 - IN GRADE PULL BOXES
SECTION 262413 - SWITCHBOARDS, 600 VOLTS AND BELOW
SECTION 262416 - PANELBOARDS AND DISTRIBUTION PANELS
SECTION 262726 - DEVICES WIRING
SECTION 262816 - CIRCUIT BREAKERS
SECTION 263213 - DIESEL GENERATOR GEN SET
SECTION 265100 - LIGHTING

DIVISION 31 – EARTHWORK

SECTION 311000 - SITE CLEARING
SECTION 312213 - ROUGH GRADING
SECTION 312316 - EXCAVATION
SECTION 312316.13 - TRENCHING
SECTION 312333 - BACKFILL

DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 321100 - SUBGRADE PREPARATION & BASE MATERIAL
SECTION 321216 - ASPHALT PAVING
SECTION 321313 - LANDSCAPE CONCRETE
SECTION 321723 - PAVEMENT MARKINGS
SECTION 321726 - TACTILE WARNING SURFACE
SECTION 323113 - CHAIN LINK FENCE AND GATES
SECTION 323119 - DECORATIVE METAL FENCE AND GATES
SECTION 328000 - IRRIGATION
SECTION 329000 - PLANTING: LANDSCAPE WORK

DIVISION 33 - UTILITIES

SECTION 331000 - WATER UTILITIES
SECTION 334000 - STORM DRAINAGE

END OF SECTION

Division 01: General Requirements

SECTION 011000 - SUMMARY OF WORK

1.0 GENERAL

1.1 SUMMARY

- A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- B. This Section includes summary of work including:
 - 1. Work covered by Contract Documents including but not limited to:
 - a. New emergency shelter building including, but not limited to, concrete slab foundation, pre-fab metal building and associated structural steel framing, hollow metal windows and doors. Interior work to include, but limited to, interior partitions, glazing, wood and metal doors, suspended acoustical and gypsum board ceilings; interior finishes including vinyl composition, resilient and epoxy flooring, painting, kitchen equipment, mechanical, plumbing and electrical systems, lighting, connection to existing utilities.
 - b. Construction of site work including grading, concrete and asphalt paving, parking striping and signage, site lighting, irrigation and landscape planting.
 - c. Limited construction of street pavement and pavement markings.
 - 2. Bid items, Allowances and Alternates.
 - a. The Base bid includes all work.
 - 3. Work under other contracts.
 - a. None
 - 4. Work sequence.
 - a. Construction shall begin with all site work, including grading and paving and construction of the pre-fab metal building
 - b. Construction of the remaining interior improvement shall conform with the schedule. It is the responsibility of the

Contractor to ensure that all work is completed within the given timeline.

5. Temporary Facilities.
6. Cooperation of contractor and coordination with other work.
7. Maintenance.
8. Occupancy requirements.
9. Reference Standards.
10. Products ordered in advance.
11. Furnished products.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Unless provided otherwise in the Contract Documents, all risk of loss to Work covered by Contract Documents shall rest with Contractor until Final Completion and Acceptance of the Work.

1.4 BID ITEMS

- A. Any bid item may be deleted in total or in part prior to or after award of Contract without compensation in any form or adjustment of other bid items or prices therefore.
 1. Contractor must coordinate related work and modify surrounding work as required to complete Work, including changes under each Alternate designated in the contract documents.

1.5 WORK SEQUENCE

- A. Construct work in stages -
 1. -

1.6 COOPERATION OF CONTRACTOR AND COORDINATION WITH OTHER WORK

- A. Should construction work, or work of any other nature, be under way by other forces or by other contractors within or adjacent to the limits of the Work, the Contractor shall cooperate with all such other contractors or forces to the end that any delay or hindrance to their work will be avoided. The cost of such cooperation will be considered as included in the bid amount and no direct or additional payment will be made therefore.
- B. The County of Monterey reserves the right to perform other or additional work, within or adjacent to the limits of the work specified, at any time by the use of other forces. The Contractor shall coordinate with the County of Monterey and any forces, or other forces, engaged by the County of Monterey, as required by the Contract General Conditions. In the event that the performance of such other or additional work materially increases or decreases the Contractor's costs, the work and the amount to be paid therefore will be appropriately adjusted as determined by the Architect.
- C. Limit use of premises for Work and for construction operations to allow for:
 - 1. Operation.
 - 2. Work by other contractors and tenants.
- D. Coordinate use of premises and access to site with other contractors, utilities, tenants, and forces, as required by the Contract General Conditions. Architect has final authority over coordination, use of premises, and access to site.
- E. Cooperate with contractors for other area work, not included in Contract, but which may take place during construction period

1.7 MAINTENANCE

- A. Cost of maintenance of systems and equipment prior to Final Acceptance will be considered as included in prices bid and no direct or additional payment will be made therefore.

1.8 OCCUPANCY REQUIREMENTS

- A. Whenever, in the opinion of Architect, Work or any part thereof is in a condition suitable for use, and the best interest of requires such use, may take beneficial occupancy of and connect to, open for public use, or use the Work or such part thereof. In such case, will request Architect to inspect the Work or part thereof, and issue a Certificate of Substantial Completion for that part of Work.

- B. Prior to date of Final Acceptance of the Work by all necessary repairs or renewals in Work or part thereof so used, not due to ordinary wear and tear, but due to defective materials or workmanship or to operations of Contractor, shall be made at expense of Contractor.
- C. Use of Work or part thereof as contemplated by this Section shall in no case be construed as constituting acceptance of Work or any part thereof. Such use shall neither relieve Contractor of any responsibilities under Contract, nor act as waiver by of any of the conditions thereof.

2.0 PRODUCTS

2.1 REFERENCE STANDARDS

- A. For products specified by association or trade standards, comply with requirements of standard, except where more rigid requirements are specified or are required by applicable codes.

3.0 EXECUTION

- A. Not applicable to this Section.

END OF SECTION

SECTION 012100 – PROJECT CONTROL SYSTEM

1.0 GENERAL

1.1 WEB DATABASE

- A. The County of Monterey will use and maintain a web-based database as the primary means of communication related to the Project's correspondence, submittals, requests for information (RFIs), advisory notices, and non-compliance issues. Correspondence from the Contractor shall be sent to the Construction Manager via the PROCORE System.
- B. The Construction Manager and Contractor shall utilize PROCORE's system for electronic submittal of all data and documents (unless specified otherwise by the Construction Manager) throughout the duration of the Contract. PROCORE is a web-based electronic media site that is hosted by PROCORE LLC utilizing their PROCORE web solution. PROCORE will be made available to the Contractor's project personnel. The joint use of this system is to facilitate electronic exchange of information, automation of key processes, and overall management of the Contract. PROCORE shall be the primary means of project information submission and management. When required by the Construction Manager, paper documents will also be required. In the event of discrepancy between the electronic version and paper documents, the paper documents will govern. PROCORE is a registered trademark of PROCORE LLC.

1.2 USER ACCESS LIMITATIONS

- A. The Construction Manager will control the Contractor's access to PROCORE by allowing access and assigning user profiles to accepted Contractor personnel. User profiles will define levels of access into the system, determine assigned function-based authorizations (determines what can be seen) and user privileges (determines what they can do).

1.3 AUTOMATED SYSTEM NOTIFICATION AND AUDIT LOG TRACKING

- A. Review comments made (or lack thereof) by the Construction Manager and Design Consultant on Contractor submitted documentation shall not relieve the Contractor from compliance with requirements of the Contract Documents. The Contractor is responsible for managing, tracking, and documenting the Work to comply with the requirements of the Contract Documents. Neither automated system notifications nor audit logs constitute validation of the Contractor's submitted information.

1.4 CONTRACTOR RESPONSIBILITY

- A. The Contractor shall be responsible for the validity of their information placed in PROCORE and for the abilities of their personnel. Accepted users shall be knowledgeable in the use of computers, including Internet Browsers, email programs,

CAD drawing applications, and Adobe Portable Document Format (PDF) document distribution program. Adobe PDF documents shall be created through electronic conversion rather than optically scanned whenever possible. The Contractor is responsible for the training of their personnel in the use of PROCORE (outside what is provided by the Construction Manager) and the other programs indicated above as needed.

B. User Access Administration:

1. Provide a list of Contractor's key PROCORE personnel for the Construction Manager's acceptance. The Construction Manager is responsible for adding and removing users from the system. The Construction Manager reserves the right to perform a security check on all potential users.

1.5 CONNECTIVITY PROBLEMS

- A. PROCORE is a web-based environment and therefore subject to the inherent speed and connectivity problems of the Internet. The Contractor is responsible for its own connectivity to the Internet. PROCORE response time is dependent on the Contractor's equipment, including processor speed, Internet access speed, etc. and current traffic on the Internet. The County of Monterey and Construction Manager will not be liable for any delays associated from the usage of PROCORE including, but not limited to: slow response time, down time periods, connectivity problems, or loss of information. The Contractor will ensure that connectivity to the PROCORE system (whether at the home office or job site) is accomplished through some form of high-speed communications with 1 Mbps as the minimum bandwidth requirements for using the system. It is recommended a faster connection be used when uploading pictures and files into the system. Under no circumstances shall the usage of PROCORE be grounds for a time extension or cost adjustment to the Contract. If there are problems that persist with the PROCORE site for more than 24 consecutive hours that prevent the electronic submission of data by the Contractor, the Contractor may submit documents in paper form to the Construction Manager until such time that the Construction Manager notifies the Contractor that the PROCORE site is operable and available for use.

1.6 TRAINING

- A. The County of Monterey has arranged for the following training to be provided to the Contractor. The Construction Manager will provide a one hour training class to the Contractor within ten (10) days of NTP at a time mutually agreeable to Contractor and Construction Manager. Thereafter the Construction Manager will provide up to one hour of additional training via telephone during the project per month of the project life.

2.0 EQUIPMENT

- A. In order to process correspondence, submittals, and RFIs, the Contractor must provide and have in place for its own use the required basic components outlined below:

2.1 HARDWARE

- A. A computer with internet access and sufficient capabilities to perform all duties stated in Section 012100; a scanner at least large enough to scan 11" x 17" sheets with sufficient resolution to maintain clarity and legibility of the document at its native size; and a color printer of sufficient size and capacity to accept incoming correspondence as described in this section.

2.2 SOFTWARE

- A. Adobe Acrobat 9 Standard; Microsoft Office 2010 or higher, including but not limited to Microsoft Word and Microsoft Excel.
- B. PROCORE currently supports Mozilla's Firefox v15.0.1 and newer, Google Chrome v22.01229.79 m and newer, Apple's Safari v6 and newer, and Microsoft's Internet Explorer v8 and v9 and newer web browsers for accessing the application. Certain functions may not be available when using any program other than the newest version of the respective web browser.

2.3 FACILITIES

- A. The Contractor shall make its own arrangements to provide high-speed (minimum speed: download 1Mbps/upload 1Mbps) internet connection for its own use as soon as practicable.

3.0 EXECUTION

- A. Items to be uploaded to PROCORE by the Construction Manager include but are not limited to: RFI responses, Submittal comments, Clarification letters, Design Clarifications, Field Orders, Potential Change Orders, and System Outage Requests et al. These items will be attached in PDF file format. These attachments may include files that need to be viewed and/or printed in color. Formal letters, stop notices, Field Orders, Progress Payment Requests, and Contract Change Orders shall always include a wet-signed hard copy.

3.1 PROCORE UTILIZATION

- A. All project related correspondence (RFIs, submittals, etc.) originated by the Contractor or Subcontractor, Supplier, et al. shall be directed to the Architect and the Construction Manager, unless otherwise indicated in the Specifications.
- B. Submittals

1. The use of the electronic communication does not waive the requirement for the provision of hard copies of all formal correspondence and, submittals. The hard copies of all documents must match the electronic copies of all correspondence and submittals.
2. Submittals shall be in accordance with Section 013300. The provisions of Section 013300 shall apply both to electronic copies and hard copies of submittals, unless otherwise stated in writing by the Construction Manager.
3. In addition to above, PROCORE shall be utilized in connection with submittal preparation and information management required by but not limited to Sections:
 - a. 00700 General Conditions
 - b. 00800 Supplementary General Conditions
 - c. 01000 Summary of Work
 - d. 012200 Unit Prices: Measurement and Payment
 - e. 012600 Modification Procedures
 - f. 012613 Requests For Information
 - g. 013113 Project Coordination
 - h. 013119 Project Meetings
 - i. 013200 Construction Progress Documents: Schedules & Reports
 - j. 013300 Submittal Procedures
 - k. 017700 Contract closeout Procedures
4. PROCORE will be utilized by all other Sections not listed above and as required by the Construction Manager.

3.2 TERMINATION OF USE

- A. The County of Monterey reserves the right to terminate the use of PROCORE for the electronic submission of data to the County of Monterey. The County of Monterey may provide an alternate project control system or require the use of paper documents submitted in accordance with the Contract Documents. The Contractor will be provided in writing ten (10) days' notice that the County of Monterey intends to discontinue use of PROCORE.

3.3 ADOBE PDF

- A. All information, comments, questions and statements shall be scanned and/or converted to the PDF file format and attached to the PROCORE system. Items to be sent via PROCORE system include but are not limited to large-format plan sheets (22" x 34" or larger), small-format plan sheets, pages within tabbed binders, RFIs, transmittal sheets, et al. The PDF attachments supplied to the Construction Manager shall be in a sufficient resolution to be fully legible at its native size.
- B. All separate files within a given piece of correspondence shall be combined into a single PDF document (i.e. An RFI that contains a text file and two photo files shall be combined into a single PDF document prior to delivery to the Construction Manager.)

3.4 LABELING FORMAT

- A. The subject line of each email, and the file name of any attached files shall begin with the file labeling scheme:

RFI_XXXX_(Contractor Name)_(Subject)
Letter_XXXX_(Contractor Name)_(Subject)
Transmittal_XXXX_(Contractor Name)_(Subject)
PCO_XXXX_(Contractor Name)_(Subject)
Submittal_XXX.ZZY_(Contractor Name)_(Subject)
- B. The first section of the label indicates the type of correspondence (i.e RFI). "XXX" indicates a unique number, sequentially assigned for the given piece of correspondence. "Y" is a sequential letter assigned for revised or resubmitted documents, i.e. A, B, or C being the 1st, 2nd, and 3rd revision or resubmittal, respectively. "(Contractor Name)" indicates to the database that the correspondence is from the Contractor. The Contractor will indicate the subject at the end of the numbering scheme. For submittals, "ZZ" indicates a unique number, sequentially assigned for each package item (see C. Submittals). Each piece of correspondence shall be sent in a separate email.
- C. Submittals - If a submittal package has multiple items, each item shall be considered a separate piece of correspondence and sent separately. For example, if "Submittal 3: Concrete" had two items, "3.01: Mix Design," and "3.02: Curing Compound," two separate items would be emailed to the Construction Manager labeled as:
Submittal_003.01_(Contractor Name)_Mix Design
Submittal_003.02_(Contractor Name)_Curing Compound

3.5 ORIGINAL DOCUMENTS

- A. Where possible, the Contractor will obtain the electronic document from its original source to maintain the integrity, legibility, and searchability of the document.

3.6 ORGANIZATION

- A. The information included in the attachments shall be organized in a logical and thoughtful manner. Where the information originated in a tabbed format (a binder, for example), the scanned and/or converted PDF file shall be electronically bookmarked accordingly using the “bookmark” function of Adobe Acrobat 9 Standard.

3.7 PRINTING

- A. Except where otherwise indicated, the Contractor will receive no hard copies of the above outlined correspondence. The Contractor will be required to print for its use, in color if necessary, any record copies, field copies, sub-contractor copies, etc., if such copies are desired.

3.8 PROJECT FORMS

- A. The Contractor shall use its own correspondence forms for attachments uploaded to PROCORE. These forms shall include the identifying information specific to the PDF document succeeding the cover form. Additionally, the Contractor shall input all identifying information within PROCORE as requested when generating a new document within the system.

END OF SECTION

SECTION 012200 - UNIT PRICES: MEASUREMENT AND PAYMENT

1.0 GENERAL

1.1 SUMMARY

- A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- B. This Section includes the description requirements and procedures for determining amount of work done and for obtaining payment for work done.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 011000 - Summary of Work
- C. Section 012600 - Modification Procedures
- D. Section 013300 - Submittal Procedures
- E. Section 013200 - Construction Progress Documentation – Schedule
- F. Section 017700 - Contract Closeout Procedures

1.3 REFERENCES

- A. Public Contract Code

1.4 SCOPE OF WORK

- A. Work under Contract, or under any bid item, allowance or alternate, shall include all abatement, labor, materials, transport, handling, storage, supervision, administration and all other items necessary for the satisfactory completion of work, whether or not expressly specified or shown.

1.5 DETERMINATION OF QUANTITIES

- A. Quantity of work to be paid for under any item for which a unit price is fixed in Contract shall be number, as determined by Architect, of units of work

satisfactorily completed in accordance with Plans and Specifications and as directed pursuant to Plans and Specifications. Unless otherwise provided, determination of number of units of work so completed will be based, so far as practicable, on actual measurement or count within prescribed or ordered limits, and no payment will be made for work done outside of limits. Measurements and computations will be made by methods as Architect may consider appropriate for class of work measured.

1.6 SCOPE OF PAYMENT

- A. Except as otherwise expressly stipulated in Section 011000 Summary of Work, payment to Contractor at the unit price or other price fixed in the contract for performing the work required under any item, or (if the contract is on a lump sum price basis) at the lump sum price fixed in the contract for performing all work required under the contract, and as either may be adjusted pursuant to any approved change order, shall be full compensation for completing, in accordance with the Contract Documents, all work required under the item or under the contract, and for all expense incurred by Contractor for any purpose in connection with the performance and completion of said work, including all incidental work necessary for completion of the Work.
- B. The Contract Sum, whether lump sum, unit price or otherwise, shall be deemed to include all costs necessary to complete required Work, shall also include any costs for loss or damage arising from nature of Work or, prosecution of the Work, or from action of elements. Unless the Contract Documents expressly provide otherwise, the Contract Sum shall be deemed to include:
 - 1. Any and all costs arising from any unforeseen difficulties which may be encountered during, and all risks of any description connected with, prosecution of Work until acceptance by the Salinas Emergency Shelter.
 - 2. All expenses incurred due to suspension, or discontinuance of Work as provided in Contract;
 - 3. Escalation to allow for cost increases between time of Contract Award and completion of Work.
- C. Whenever it is specified herein that Contractor is to do work or furnish materials of any class for which no price is fixed in the Contract, it shall be understood that Contractor is to do such work or furnish such materials without extra charge or allowance or direct payment of any sort, and that cost of doing work or furnishing materials is to be included in price bid, unless it is

expressly specified herein, in particular cases, that work or material is to be paid for as extra work.

- D. No payment shall be made for materials or equipment not yet incorporated into the Work, except as follows:

NONE.

- E. For the above listed materials and equipment, where Contractor requests payment on the basis of such materials and equipment not incorporated in the Work, Contractor must satisfy the following conditions:

1. The materials and/or equipment shall be delivered and suitably stored at the site or at another location agreed to in writing, for example, a mutually acceptable warehouse;
2. Full title to the materials and/or equipment shall vest in Salinas Emergency Shelter at the time of deliver to the site, warehouse or other storage location;
3. Contractor shall obtain a negotiable warehouse receipt, endorsed over to the County of Monterey for materials and/or equipment stored in an off-site warehouse. No payment shall be made until such endorsed receipts are delivered to Architect;
4. Stockpiled materials and/or equipment shall be available for the County of Monterey inspection. Materials and/or equipment shall be segregated and labeled or tagged to specifically identify this specific Contract;
5. After delivery of materials and/or equipment, if any inherent or acquired defects are discovered, defective materials and/or equipment shall be removed and replaced with suitable materials and/or equipment at Contractor's expense;
6. At its expense, Contractor shall insure the materials and/or equipment against theft, fire, vandalism, and malicious mischief, as well as any other coverages required under the Contract Documents;
7. Contractor's application for payment shall be accompanied by a bill of sale, invoice or other documentation warranting that the County of Monterey has received the materials and equipment free and clear of all liens and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect the County of Monterey's interest therein, all of which must be satisfactory to the County of Monterey.

1.7 BASIS OF PAYMENT

- A. Unit Pay Quantities: When estimated quantity for specific portions of Work is listed in Bid Form, quantity of work to be paid for shall be actual number of units satisfactorily completed in accordance with Plans and Specifications.
- B. Lump Sum: When estimated quantity for specific portion of Work is not indicated and unit is designated as Lump Sum, payment will be on a Lump Sum basis for Work satisfactorily completed in accordance with Plans and Specifications.
- C. Allowances: Allowance items will be paid for as provided in Section 011000 Summary of Work. Funds authorized for Allowance work will not be released for contract payments unless additional work has been authorized in writing by the County of Monterey.
- D. Payment for all work included in Contract Documents shall be included in lump sum or unit price or prices bid, and no direct or additional payments will be made for any incidental work.
- E. The County of Monterey does not expressly, or by implication, agree, warrant, or represent in any manner, that actual amount of Work will correspond with amount shown or estimated and reserves right to increase or decrease amount of any class or portion of Work, to leave out entire Bid Item or Items, or to add work not included in Bid, when in its judgment such change is in best interest of the County of Monterey. No change in Work shall be considered waiver of any other condition of Contract. No claim shall be made for anticipated profit, for loss of profit, for damages, or for extra payment whatever, except as otherwise expressly provided for in Contract Documents, because of any differences between amount of work actually done and estimated amount as set forth herein, or for elimination of extra Bid Items.

1.8 PROGRESS PAYMENTS

- A. Progress payments will be made monthly.
- B. Schedule of Values:
 - 1. Within thirty (30) calendar days from issuance of Notice of Award and prior to the Contractor's application for the first progress payment, the Contractor shall submit a detailed breakdown of its bid by scheduled Work items and/or activities, including coordination responsibilities and project record document responsibilities. The Contractor shall furnish such breakdown, of the total Contract Sum, by assigning dollar values (cost estimates) to each applicable Progress Schedule network activity, which cumulative sum equals the total Contract Sum. The

format and detail of the breakdown shall be as directed by the Architect to facilitate and clarify future progress payments to Contractor for direct Contact Work. This breakdown shall be referred to as the Schedule of Values.

2. The Contractor's overhead, profit, insurance, cost of bonds and/or other financing, as well as "general conditions costs," (for example, site cleanup and maintenance, temporary roads and access, off site access roads, temporary power and lighting, security and the like), shall be prorated through all activities so that the sum of all the Schedule of Values line items equal the Contractor's total Contract Sum, less any allowances designated by the Architect.
3. The Architect will review the breakdown in conjunction with the Progress Schedule to ensure that the dollar amounts of this Schedule of Values are, in fact, fair market cost allocations for the Work items listed. Upon favorable review by the Architect, this Schedule of Values will be accepted for use by the Architect. The County of Monterey and the Architect shall be the sole judges of fair market cost allocations.
4. Any attempt to increase the cost of early activities, that is, "front loading," will be rejected by the County of Monterey, resulting in a complete reallocation of monies until such "front loading" is corrected. Repeated attempts at "front loading" may result in suspension or termination of the Work or refusal to process progress payments, until such time as the Schedule of Values is acceptable to the County of Monterey.

C. Payment Requests:

1. On or before the 25th day of each month, the Contractor shall submit to the Architect a request for payment for the cost of the Work put in place during the period from the [1st] day of the previous month to the [30th] day of the previous month. Such requests for progress payments shall be based upon Schedule of Values prices of all labor and materials incorporated in the Work up until midnight of the last day of that one month period, less the aggregate of previous payments. If Contractor is late submitting its payment request, that payment request may be processed at any time during the succeeding one month period, resulting in processing of Contractor's payment request being delayed for more than a day for day basis.
2. Payment requests may include, but are not necessarily limited to the following:

- a. Material, equipment and labor incorporated into the Work, less any previous payments for the same;
 - b. Up to seventy-five percent (75%) of the cost of major equipment identified in paragraph 1.05.D above, if purchased and delivered to the site or stored off site, as may be approved by the Architect.
 - c. Up to fifty percent (50%) of the cost of materials identified in paragraph 1.05.D above specifically fabricated for the Project that are not yet incorporated into the Work.
3. Contractor shall, at the time any payment request is submitted, certify in writing the accuracy of the payment request and that Contractor has fulfilled all scheduling requirements of the Contract General Conditions (refer to AIA Document A201-1997, included in Part A of this book) and Section 013200, Construction Progress Documentation -Schedules and Reports, including updates and revisions. The certification shall be executed by a responsible officer of the Contractor.
4. No progress payment will be processed prior to Architect receiving all requested, acceptable schedule update information.
5. Each payment request shall list each Change Order executed prior to date of submission, including the Change Order Number, and a description of the work activities, consistent with the descriptions of original work activities. Contractor shall submit a monthly Change Order status log to Architect.
6. If Architect requires substantiating data, Contractor shall submit information requested by Architect, with cover letter identifying Project, payment request number and date, and detailed list of enclosures. Contractor shall submit one copy of substantiating data and cover letter for each copy Payment request submitted.
7. Monthly progress payments shall be made, based on total value of activities completed or partially completed, as determined by the County of Monterey with participation of Contractor, and based upon approved activity costs. Accumulated retainage will be shown as separate item in payment summary. If Contractor fails or refuses to participate in construction progress evaluation with the County of Monterey, Contractor shall not receive current payment until Contractor has participated fully in providing construction progress information and schedule update information for the County of Monterey.

8. No progress payment will be processed prior to Architect receiving all requested, acceptable prevailing wage and certified payroll information.

D. Progress Payments:

1. Upon receiving Contractor's payment request, Architect will review the payment request and make necessary adjustments to percent of completion of each activity. One copy will be returned to Contractor with description of adjustments made. All parties will update percentage of completion values in the same manner, that is, express value of an accumulated percentage of completion to date.
2. The payment request may be reviewed by Architect, Architect/Engineer and/or inspectors, for the purpose of determining that the payment request is a proper payment request, and shall be rejected, revised or approved by the Architect pursuant to the cost breakdown prepared in accordance with Section 1.7B of this Section.
3. If it is determined that the payment request is not a proper payment request suitable for payment, Architect shall return it to the Contractor as soon as practicable, but no later than seven (7) days after receipt, together with a document setting forth in writing the reasons why the payment request is not proper.
4. Pursuant to Public Contract Code Section 20104.50, if the County of Monterey fails to make any progress payment within thirty (30) days after receipt of an undisputed and properly submitted payment request from a contractor, the County of Monterey shall pay interest to the Contractor equivalent to the legal rates set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure. The thirty (30) day period shall be reduced by the number of days by which the County of Monterey exceeds the seven (7) day return requirement set forth herein.
5. As soon as practicable after approval of each request for progress payment, the County of Monterey will pay to Contractor in manner provided by law, an amount equal to ninety percent (90%) of Architect's estimate, or a lesser amount if so provided in Contract Documents, provided that payments may at any time be withheld if, in judgment of Architect, Work is not proceeding in accordance with Contract, or Contractor is not complying with requirements of Contract.
6. Before any progress payment or final payment is made, the Contractor may be required to submit satisfactory evidence that Contractor is not

delinquent in payments to employees subcontractors, suppliers, or creditors for labor and materials incorporated into Work.

7. The County of Monterey reserves and shall have the right to withhold payment for any equipment and/or specifically fabricated materials that, in the sole judgment of the Architect, is not adequately and properly protected against weather and/or damage, prior to or following incorporation into the Work.
8. Granting of progress payment or payments by the County of Monterey or receipt thereof by Contractor, shall not be understood as constituting in any sense acceptance of Work or of any portion thereof, and shall in no way lessen liability of Contractor to replace unsatisfactory work or material, though unsatisfactory character of work or material may have been apparent or detected at time payment was made.
9. When the County of Monterey shall charge sum of money against Contractor under any provision of Contract, amount of charge shall be deducted and retained by the County of Monterey from amount of next succeeding progress payment or from any other monies due or that may become due Contractor under Contract. If, on completion or termination of Contract, such monies due Contractor are found insufficient to cover the County of Monterey charges against him, the County of Monterey shall have right to recover balance from Contractor or Sureties.

1.9 RETENTION

- A. Pursuant to provisions of Public Contract Code Section 22300, substitution of securities for any monies withheld under Contract to insure performance is permitted under following conditions:
 1. At request and expense of Contractor, securities listed in Section 16430 of the Government Code, 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 Contractor and the County of Monterey which are equivalent to the amount withheld under retention provisions of Contract shall be deposited with Controller or with a state or federally chartered bank in California, as the escrow agent, who shall then pay such monies to Contractor. Upon satisfactory completion of Contract, securities shall be returned to Contractor.
 2. Alternatively, Contractor may request and the County of Monterey shall make payment of retentions earned directly to the escrow agent at

the expense of the Contractor. At the expense of the Contractor, the Contractor may direct the investment of the payments into securities and the Contractor shall receive the interest earned on the investments upon the same terms provided for in this Section for securities deposited by the Contractor. Upon satisfactory completion of the Contract, the Contractor shall receive from escrow agent all securities, interest, and payments received by the escrow agent from the County of Monterey, pursuant to the terms of this Section. The Contractor shall pay to each subcontractor, not later than twenty (20) days after receipt of the payment, the respective amount of interest earned, net of costs attributed to retention withheld from each subcontractor, on the amount of retention withheld to insure the performance of the Contractor.

3. Contractor shall be beneficial owner of securities substituted for monies withheld and shall receive any interest thereon.
4. Contractor shall enter into escrow agreement with Controller as authorized under Public Contract Code Section 22300, specifying amount of securities to be deposited, terms and conditions of conversion to cash in case of default of Contractor, and termination of escrow upon completion of Contract.

1.10 FINAL PAYMENT

- A. As soon as practicable after all required Work is completed in accordance with Contract, including Contractor maintenance after Final Acceptance, the County of Monterey will pay to Contractor, in manner provided by law, unpaid balance of contract price of Work, or whole contract price of Work if no progress payment has been made, determined in accordance with terms of Contract, less sums as may be lawfully retained under any provisions of Contract or by law.
- B. Prior progress payments shall be subject to correction in the final payment. Architect's determination of amount due as final payment shall be final and conclusive evidence of amount of Work performed by Contractor under Contract, and shall be full measure of compensation to be received by Contractor.
- C. Contractor and each assignee under an assignment in effect at time of final payment, and as a condition precedent to final payment, shall release the County of Monterey, its officers, agents, employees, Architect and all consultants from liabilities, obligations, and claims arising under Contract.

1.11 EFFECT OF PAYMENT

- A. Payment will be made by the County of Monterey, based on the Architect's observations at the site and the data comprising the Application for Payment. Payment will not be a representation that the Architect has:
1. Made exhaustive or continuous on-site inspections to check the quality or quantity of Work;
 2. Reviewed construction means, methods, techniques, sequences or procedures;
 3. Reviewed copies of requisitions received from subcontractors and material suppliers and other data requested by the County of Monterey 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 Sum.

2.0 PRODUCTS

- A. Not applicable to this Section.

3.0 EXECUTION

- A. Not applicable to this Section.

END OF SECTION

SECTION 012600 - MODIFICATION PROCEDURES

1.0 GENERAL

1.1 SUMMARY

- A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- B. This Section includes the description of general procedural requirements for alterations, modifications and extras.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 011000 - Summary of Work
- C. Section 012100 - Project Control System
- D. Section 012200 - Unit Prices: Measurement and Payment
- E. Section 012613 - Requests for Information

1.3 GENERAL

- A. Any change in scope of work or deviation from Drawings or Specifications shall be accomplished only when authorized in writing by Architect.
- B. Changes in scope of Work or deviation from Drawings or Specifications may be initiated only by the Contractor or the Architect.
 - 1. Contractor may initiate changes by submitting Requests for Information (RFI), Notice of Concealed or Unknown Conditions, or Notice of Hazardous Waste Conditions.
 - a. RFIs shall be submitted to seek clarification of Contract Documents.
 - 2. Contractor shall be responsible for its costs to implement and administer RFIs throughout the Contract duration. Regardless of the number of RFIs submitted, Contractor will not be entitled to additional compensation. Contractor shall be responsible for both the County of

Monterey's Architect's administrative costs for answering its RFIs where the answer could reasonably be found by reviewing the Contract Documents, as determined by Architect; such costs will be deducted from progress payments.

3. Architect may initiate changes by issuing a Supplemental Instruction.
4. Architect may initiate changes by issuing Requests For Proposal (RFP) to Contractor. Such RFPs will detail all proposed changes in the Work and request a quotation of changes in Contract Sum and Contract Times from Contractor.

1.4 PROCEDURE

- A. Contractor shall submit RFI to Architect. Architect shall respond by issuing a Clarification.
 1. If Contractor is satisfied with the Clarification and does not request change in Contract Sum or Contract Times, then the Clarification shall be executed without a change.
 2. If Contractor believes that the Clarification results in change in Contract Sum or Contract Times, Contractor shall notify Architect who may then deny request for change or issue RFP.
- B. Contractor shall submit Notices of Concealed or Unknown Conditions to resolve unanticipated conditions incurred in the execution of the Work. If Architect determines that a change in Contract Sum or contract Times is justified, Architect shall issue RFP. Architect shall issue Supplemental Instruction to Contractor. Contractor shall not proceed with Supplemental Instruction until Architect approves it in writing.
 1. If Contractor is satisfied with Supplemental Instruction and does not request change in Contract Sum or Contract Times, then Supplemental Instruction shall be executed without a Change Order.
 2. If Contractor believes that Supplemental Instruction results in change in Contract Sum or Contract Times, Contractor shall notify Architect. Architect may then deny request for change, cancel Clarification or issue RFP.
- C. Responses by recipients shall be within a reasonable time.
- D. Contractor shall respond to Architect's RFP within fifteen (15) working days by furnishing a complete breakdown of costs of both credits and extras;

itemizing materials, labor, taxes, overhead and profit. Subcontract work shall be so indicated.

- E. Upon approval of RFP, Architect will issue a Change Order directing Contractor to proceed with extra work.
- F. Payment shall be made as follows:
 - 1. Change Orders which increase Contract Sum or Contract Times shall be included in next Contract Modification Form, signed by Architect, accepted by Contractor.
 - 2. Payment shall be made for Change Order work along with other work in progress payment following completion of Change Order work. Partial completion of Change Order work shall be paid for that part completed during the period covered by the monthly payment request.

1.5 COST DETERMINATION

- A. Total cost of extra work shall be the sum of labor costs, material costs, equipment rental costs and specialist costs as defined herein plus overhead and profit as allowed herein. This limit applies in all cases of claims for extra work, whether calculating Change Orders, RFPs, or calculating claims of all types, and applies even in the event of fault, negligence, strict liability, or tort claims of all kinds, including misrepresentation, concealment, strict liability or negligence. No other costs arising out of or connected with the performance of extra work, of any nature, may be recovered by Contractor. No special, incidental or consequential damages may be claimed or recovered against the County of Monterey, its representatives or agents, whether arising from breach of contract, negligence or strict liability, unless specifically authorized in the Contract Documents.
- B. Overhead and Profit:
 - 1. Overhead shall be as defined in Article 1.8, below.
 - 2. Overhead and profit on labor for extra work shall be 15 percent (15%).
 - 3. Overhead and profit on materials for extra work shall be 15 percent (15%).
 - 4. Overhead and profit on equipment rental for extra work shall be 15 percent (15%).

5. When extra work is performed by a first tier subcontractor, Contractor shall receive a 10 percent (10%) markup on subcontractors' total costs of extra work.
6. When extra work is performed by a lower tier subcontractor, Contractor shall receive a 10 percent (10%) markup on the lower tier subcontractors' total costs of extra work. Contractor and first tier subcontractors shall divide the markup as mutually agreed.
7. Credit for overhead and profit on deleted work shall be 5% for the Contractor actually performing the work plus applicable reductions insurance and bond cost.

C. Taxes:

1. Monterey County Sales Tax should be included.
2. Federal and Excise Tax shall not be included.

D. County-Operated Equipment: When County-operated equipment is used to perform extra work, Contractor will be paid for equipment and operator as follows:

1. Payment for equipment will be made in accordance with Paragraph 1.5D, below.
2. Payment for cost of labor will be made at no more than rates of such labor established by State of California Department of Industrial Relations schedule of Prevailing Wages at the time such work was performed, whether or not the labor was actually covered by such an agreement.

1.6 COST BREAKDOWN

- A. Contractor to submit complete breakdown cost proposal identifying labor hours x rate, material quantity x unit price, equipment rental hours x rate and subcontract cost proposals. Markups shall be shown as a separate line-item on the proposal in accordance with Article 1.4B, above. Subcontractors and vendors shall also provide cost breakdowns in accordance with the requirements of the Contract and this Section.
- B. Labor: Contractor will be paid cost of labor for workers (including forepersons when authorized by Architect) used in actual and direct performance of extra work. Labor rate, whether employer is Contractor, subcontractor or other forces, will be sum of following:

1. Actual Wages - Actual wages paid shall include any employer payments to or on behalf of workers for health and welfare, pension, vacation and similar purposes.
 2. Labor Surcharge - Payments imposed by the County of Monterey, State and Federal laws and ordinances, and other payments made to, or on behalf of, workers, other than actual wages as defined in subparagraph 1 above, such as taxes and insurances. Labor surcharge shall be as set forth in California Department of Industrial Relations labor rate classification schedule which is in effect on date upon which extra work is accomplished and which schedule is incorporated herein by reference as though fully set forth herein.
- C. Material: Only materials furnished by Contractor and necessarily used in performance of extra work will be paid for. Cost of such materials will be cost, including sales tax, to purchaser (Contractor, subcontractor or other forces) from supplier thereof, except as the following are applicable:
1. If cash or trade discount by actual supplier is offered or available to purchaser, it shall be credited to the County of Monterey notwithstanding fact that such discount may not have been taken.
 2. For materials salvaged upon completion of extra work, salvage value of materials shall be deducted from cost, less discount, of materials.
 3. If cost of a material is, in opinion of Architect, excessive, then cost of material shall be deemed to be lowest current wholesale price at which material is available in quantities concerned delivered to Site, less any discounts as provided in subparagraph 1 above.
- D. Equipment Rental: For Contractor or subcontractor-owned equipment, payment will be made at rental rates listed for equipment in California Department of Transportation official equipment rental rate schedule which is in effect on date upon which extra work is accomplished and which schedule is incorporated herein by reference as though fully set forth herein. For rented equipment, payment will be made based on actual rental invoices. Equipment used on extra work shall be of proper size and type. If, however, equipment of unwarranted size or type and cost is used, cost of use of equipment shall be calculated at rental rate for equipment of proper size and type. Rental rates paid shall be deemed to cover cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals. Unless otherwise specified, manufacturer's ratings, and manufacturer approved modifications, shall be used to classify equipment for determination of applicable rental rates. Individual pieces of equipment or tools not listed in said publication and having a replacement value of one hundred dollars (\$100) or less, whether or

not consumed by use, shall be considered to be small tools and no payment will be made therefor as payment is included in payment for labor. Rental time will not be allowed while equipment is inoperative due to breakdowns.

1. For equipment on Site, rental time to be paid for equipment shall be time equipment is in operation on extra work being performed or on standby as approved by Architect. The following shall be used in computing rental time of equipment:
 - a. When hourly rates are listed, less than thirty (30) minutes of operation shall be considered to be one-half (1/2) hour of operation.
 - b. When daily rates are listed, less than four (4) hours of operation shall be considered to be one-half (1/2) day of operation.
2. For equipment which must be brought to Site to be used exclusively on extra work, cost of transporting equipment to Site and its return to its original location shall be determined as follows:
 - a. The County of Monterey will pay for costs of loading and unloading equipment.
 - b. Cost of transporting equipment in low bed trailers shall not exceed hourly rates charged by established haulers.
 - c. Cost of transporting equipment shall not exceed applicable minimum established rates of California Public Utilities Commission.
 - d. Payment for transporting, and loading and unloading equipment as above provided will not be made if equipment is used on Work in any other way than upon extra work.
3. Rental period shall begin at time equipment is unloaded at Site of extra work and terminate at end of day on which Architect directs Contractor to discontinue use of equipment. Excluding Saturdays, Sundays, and legal holidays, unless equipment is used to perform extra work on such days, rental time to be paid per day shall be four (4) hours for zero (0) hours of operation, six (6) hours for four (4) hours of operation and eight (8) hours for eight (8) hours of operation, time being prorated between these parameters. Hours to be paid for equipment which is operated less than eight (8) hours due to breakdowns, shall not exceed eight (8) less number of hours equipment is inoperative due to breakdowns.

- E. Work Performed by Special Forces or Other Special Services: When Architect and Contractor, by agreement, determine that special service or item of extra work cannot be performed by forces of Contractor or those of any subcontractors, service or extra work item may be performed by specialist. Invoices for service or item of extra work on basis of current market price thereof may be accepted without complete itemization of labor, material, and equipment rental costs when it is impracticable and not in accordance with established practice of special service industry to provide complete itemization. In those instances wherein Contractor is required to perform extra work necessitating a fabrication or machining process in a fabrication or machine shop facility away from Site, charges for that portion of extra work performed in such facility may, by agreement, be accepted as a specialist billing. Architect must be notified in advance of all off site work. To specialist invoice price, less credit to the County of Monterey for any cash or trade discount offered or available, whether or not such discount may have been taken, will be added 15 percent (15%) in lieu of overhead and profit provided in Paragraph 1.4B, above.
- F. Deleted Work and Credits: When a change request, RFI, RFP, or Construction Change Directive includes both additive and deductive work, the total mark-up shall be on the net sum of the change.

1.7 FORCE-ACCOUNT

- A. If it is impracticable because of nature of work, or for any other reason, to fix an increase or decrease in price definitely in advance, a Construction Change Directive may be issued in accordance with Article 7.3 Construction Change Directives from General Conditions of the Contract for Construction, AIA Document A201-1997 (included in Part A of this book) to fix a maximum price which shall not under any circumstances be exceeded, and subject to such limitation, such alteration, modification or extra shall be paid for at actual necessary cost as determined by the County of Monterey, which cost shall be determined pursuant to Article 1.4, above, and shall be known as Force-Account work.
- B. Whenever any Force-Account work is in progress, definite price for which has not been agreed on in advance, Contractor shall report to Architect each day in writing in detail amount and cost of labor and material used, and any other expense incurred in Force-Account work on preceding work day, and no claim for compensation for Force-Account work will be allowed unless report shall have been made.
- C. Above described methods of determining payment for work and materials shall not apply to performance of work or furnishings of material which, in judgment of Architect, may properly be classified under items for which prices are established in Contract.

1.8 FURNISHED MATERIALS

- A. The County of Monterey reserves right to furnish materials as it deems advisable, and Contractor shall have no claims for costs and overhead and profit on such materials.

1.9 OVERHEAD DEFINED

- A. The following constitutes charges that are included in overhead for all contract modifications, including Force-Account work:
 - 1. Drawings: field drawings, shop drawings, etc. including submissions of drawings.
 - 2. Routine field inspection of work proposed.
 - 3. General Superintendence.
 - 4. General administration and preparation of change orders.
 - 5. Computer services.
 - 6. Reproduction services.
 - 7. Salaries of project engineer, project manager, superintendent, timekeeper, storekeeper and secretaries.
 - 8. Janitorial services.
 - 9. Temporary on-site facilities.
 - a. Offices
 - b. Telephones
 - c. Plumbing
 - d. Electrical: Power, lighting
 - e. Platforms
 - f. Fencing, and so on.
 - g. Home office expenses.

- h. Procurement and use of vehicles and fuel used coincidentally in base bid work.
- i. Surveying
- j. Estimating
- k. Protection of work
- l. Final cleanup
- m. Other incidental work

1.10 RECORDS AND CERTIFICATION

- A. Force-Account (cost reimbursement) charges shall be recorded daily upon Cost Breakdown for Contract Modification Form obtained from or approved by the Architect. Contractor or authorized representative shall complete and sign form. Architect or Inspector shall sign form indicating approval of labor and equipment hours and material used only. Contract Modification Form shall provide names and classifications of workers and hours worked by each, itemize materials used, and also list size type and identification number of equipment, and hours operated, and shall indicate work done by specialists.
- B. No payment for Force-Account work shall be made until Contractor submits original invoices substantiating materials and specialist charges.
- C. The County of Monterey shall have the right to audit all records in possession of Contractor relating to activities covered by Contractor's claims for modification of Contract, including Force-Account work, as set forth in Article 7.3 Construction Change Directives from General Conditions of the Contract for Construction, AIA Document A201-1997 (included in Part A of this book).
- D. Further, the County of Monterey shall have right to audit, inspect, or copy all records maintained in connection with this Contract, including financial records, in possession of Contractor relating to any transaction or activity occurring or arising out of, or by virtue of, Contract. If Contractor is a joint venture, right of the County of Monterey shall apply collaterally to same extent to records of joint venture sponsor, and of each individual joint venture member.

2.0 PRODUCTS

- A. Not applicable to this Section.

Project: 855 East Laurel Drive Emergency Shelter
Project No. 8875
Bid No. 10736

3.0 EXECUTION

- A. Not applicable to this Section.

END OF SECTION

SECTION 012613 - REQUESTS FOR INFORMATION

1.0 GENERAL

1.1 SUMMARY

- A. This Section includes the procedures to be followed by the Contractor upon discovery of any apparent conflicts, omissions, or errors in the contract documents, or upon having any questions concerning interpretation.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 012100 - Project Control System

1.3 PROCEDURES

- A. Notification by Contractor: Should the Contractor discover conflicts, omissions, or errors in the contract documents, or have any questions concerning interpretation or clarification of the contract documents, or if it appears to the contractor that work to be done or any matter relative thereto are not sufficiently detailed or explained in the contract documents, then, before proceeding with the work affected, the Contractor shall immediately notify the Architect in writing and request interpretation, clarification, or additional detailed instructions concerning the work. The Contractor shall ask for any clarification or request for information immediately upon discovery, but no less than fifteen (15) days prior to the start date of the activities related to the clarification, based on the latest updated version of the accepted contract schedule.
- B. Form: The Contractor shall submit all requests for clarification and/or additional information in writing to the Architect using the Request For Information (RFI) procedure as outlined in Section 012100, Project Control System.
- C. The Contractor will number RFIs consecutively with the date of issue, except for reissuance of a respective RFI in which the subscript a, b, c, and so on, will be added until the RFI is resolved.
- D. Response Time: The Architect, whose decision will be final and conclusive, shall resolve such questions and issue instruction to the Contractor within a reasonable amount of time, but no less than 14 calendar days. In some cases, this time may need to be lengthened or shortened for emergency situations as mutually agreed upon by all parties. Should the Contractor proceed with the work affected before receipt of a response from the Architect within the response time described above, any portion of the work which is not done in accordance with the Architect's interpretation,

clarifications, instructions, or decisions subject to removal or replacement and the Contractor shall be responsible for all losses.

- E. Reason for Submission: The Contractor may submit RFIs if one of the following conditions occur:
1. The Contractor discovers an unforeseen condition or circumstance that is not described in the contract documents.
 2. The Contractor discovers an apparent conflict or discrepancy between portions of the contract documents and appears to be inconsistent or is not reasonably inferred from the intent of the contract documents.
 3. The Contractor discovers what appears to be an omission from the contract documents that cannot be reasonably inferred from the intent of the contract documents.
- F. Rejections: RFIs will not be recognized or accepted if in the opinion of the Architect one of the following conditions exists:
1. The Contractor submits an RFI as a submittal.
 2. The Contractor submits the RFI under the pretense of a contract documents discrepancy or omission without thoroughly reviewing the documents.
 3. The Contractor submits the RFI in a manner that suggests that specific portions of the contract documents are assumed to be excluded, or taken as an isolated portion of the contract documents in part rather than whole.
 4. The Contractor submits an RFI in an untimely manner without proper coordination and scheduling of work or related trades.
- G. Subject: Each RFI shall be limited to one subject.
- H. Additional Detailed Instructions: The Architect may furnish additional detailed written instructions to further explain the work, and such instructions shall be a part of the contract documents. Should additional detailed instructions in the opinion of the Contractor constitute work in excess of the scope of the contract the Contractor shall submit notification immediately and written notification thereof to the Architect no more than seven calendar days following receipt of such instruction, and in any event prior to the commencement of work thereon. The Architect will then consider such notice, and if the Architect considers it justified, the Architect's instructions will be revised or a proposed change order will be issued. The Contractor shall have no claim for additional compensation or extension of the schedule because of any such additional instructions unless the Contractor provides the Architect written notice thereof within the time frame specified above. In addition, the Contractor shall within 15 days from the date of notification provide detailed justification and analysis as well as compete pricing and schedule CPM network analysis to support any request

for time extension. For more details, see Article 7 Changes in the Work from General Conditions of the Contract for Construction, AIA Document A201-1997 (Part A of this book).

2.0 PRODUCTS

A. Not applicable to this Section.

3.0 EXECUTION

A. Not applicable to this Section.

END OF SECTION

SECTION 013113 - PROJECT COORDINATION

1.0 GENERAL

1.1 SUMMARY

- A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- B. Coordinate the Work; do not delegate the responsibility for coordination to any Subcontractor.
 - 1. Resolve differences or disputes concerning coordination, interference, or extent of Work of the various Sections.
 - 2. The Contractor's decisions regarding work by subcontractors, if consistent with the requirements of the Contract Documents, shall be final.
- C. Coordinate Work to assure efficient and orderly sequence of installation of construction elements.
- D. Perform and complete checking and coordination before commencing Work in the affected areas.
- E. Verify characteristics of interrelated operating equipment are compatible; coordinate Work having interdependent responsibilities for installing, connection to, and placing such equipment in service.
- F. Provide basic layouts of grid lines and station points on subfloors as necessary to facilitate coordination and layout of partitions and Work at and above ceilings.
- G. Make provisions for accommodating Work to be provided by others.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

1.3 COORDINATION DRAWINGS

- A. Prepare large-scale coordination drawings before beginning fabrication or delivery of materials and equipment to the job site.

1. Drawings shall clearly indicate coordination of mechanical, electrical, and equipment installations with structural and architectural elements.
- B. Keep copies of coordination drawings at the job site.
- C. The Architect will verify that coordination drawings have been made, but no review of the drawings will be made.

1.4 MECHANICAL AND ELECTRICAL COORDINATION

- A. Use coordination drawings of mechanical and electrical Work, together with Shop Drawings and layout drawings of affected Work to check; coordinate and integrate the Work to prevent interferences.
- B. Coordinate space requirements and installation of mechanical and electrical Work which are indicated diagrammatically on Drawings.
- C. Routing shown for pipes, ducts, and conduits is diagrammatic only; make runs parallel with lines of building.
- D. Utilize spaces efficiently to maximize accessibility for other installation, for maintenance, and for repairs.
- E. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated; coordinate locations of fixtures and outlets with finish elements.

2.0 PRODUCTS

- A. Not applicable to this Section.

3.0 EXECUTION

- A. Not applicable to this Section.

END OF SECTION

SECTION 013119 - PROJECT MEETINGS

1.0 GENERAL

1.1 PRECONSTRUCTION CONFERENCE

A. Prior to commencement of Work, a preconstruction conference will be held to discuss procedures to be followed during the progress of the Work.

1. The preconstruction conference will be held at a location designated by the Architect.

B. Attending the conference shall be:

1. Salinas Emergency Shelter's representatives.

2. County of Monterey representatives.

3. Architect's representatives.

4. Salinas Emergency Shelter's consultants.

5. Architect's subconsultants.

6. Contractor's representatives.

7. Contractor's superintendent.

8. Designated major Subcontractors.

9. Others requested by the Architect.

1.2 PROGRESS MEETINGS

A. Weekly progress meetings will be held throughout the progress of the Work; location shall be in Architect's field office.

B. The Architect will prepare agenda with copies for participants, preside at meetings, record minutes and distribute copies within three (3) work days to the Architect, meeting participants, and those affected. Procore will be used for the meeting documentation.

C. Attendance and Participation: Project superintendent, Salinas Emergency Shelter representatives, Architect, Architect's subconsultants, County of Monterey representatives, Salinas Emergency Shelter's representative

consultants, and major subcontractors as appropriate to agenda topics for each meeting.

- D. Suggested Agenda: Review of Work progress, status of progress CPM schedule and adjustments, delivery schedules, submittal status report, RFI status report, maintenance of quality standards, pending changes, and substitutions.
- E. Special Meetings: Schedule and administer other meetings as required by the progress of the Work and to review provisions and tests specified elsewhere in the Contract Documents.
 - 1. Schedule special meetings when so requested by the Architect.

1.3 BILLING MEETINGS

- A. As part of the last progress meeting each month, schedule and hold a billing meeting, with the Architect in attendance.
 - 1. Purpose of billing meeting is for agreeing on the percentage of Work completed to that date and to establish the sum to be requested in the Application for Payment.
- B. Prepare an itemized draft of the month's proposed billing for review at the meeting.

1.4 PRE-INSTALLATION/APPLICATION MEETINGS

- A. Meetings to review installation and application shall be scheduled a minimum of fourteen (14) days prior to the start of installations and applications.
 - 1. Attending shall be Project superintendent, Salinas Emergency Shelter's representatives, the County of Monterey, Architect, manufacturers' representatives and installers of products involved, other installers whose Work may affect or be affected by the Work to be reviewed, and Testing Laboratory Inspector.
- B. Review in detail the Contract Documents and manufacturers' requirements, Specifications, installation drawings and details, and Drawings and Details of affected Work.
 - 1. Resolve discovered and anticipated conflicts, incompatibilities, and inadequacies at the conference.

- C. Review in detail Project conditions, schedules, construction sequence, requirements for applications and qualities of completed applications, and protection of adjacent Work and property.
- D. Review in detail means of protecting the completed applications during the remainder of the construction period.

1.5 SCHEDULE APPROVAL MEETINGS

- A. Prior to approval of the CPM schedule, the Architect may require that the Contractor and its Subcontractors attend meetings to ascertain information for approval of the CPM schedule.
- B. This information may include, but will not be limited to, productivity, manpower loading, equipment planning, activity durations, logic, cost loading, and other pertinent matters.
- C. Attending shall be the Contractor, Subcontractors as appropriate, suppliers as appropriate, and others as appropriate.

2.0 PRODUCTS

- A. Not applicable to this Section.

3.0 EXECUTION

- A. Not applicable to this Section.

END OF SECTION

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION: SCHEDULES AND REPORTS

1.0 GENERAL

1.1 SUMMARY

- A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- B. Scheduling of Work under this Contract shall be performed by Contractor in accordance with requirements of this Section.
- C. Upon Award of Contract, Contractor shall immediately commence development of the Schedule to ensure compliance with schedule submittal requirements.
- D. Contract schedule shall be based on and incorporate Contract milestone and completion dates specified in Contract Documents.
- E. Overall time of completion and time of completion for each milestone shown on Contract schedule shall adhere to times specified in the Contract Special Provisions.
 - 1. The Architect is not required to accept an earlier (advanced) schedule.
 - 2. Contractor shall not be entitled to any compensation for any field or home office overhead in event agreement is not reached on an earlier (advanced) schedule and Contractor completes its Work, for whatever reason, beyond completion date shown in earlier (advanced) schedule.
 - 3. A schedule showing the work completed in less than the Contract time, which has been accepted by the Architect, shall be considered to have Project Float. The Project Float is the time between the scheduled completion of the work and Contract Substantial Completion.
 - 4. Project Float is a resource available to both the Architect and the Contractor.
- F. Contract schedule shall be basis for evaluating job progress, payment requests, and time extension requests. Responsibility for developing Contract CPM schedule and monitoring actual progress as compared to schedule rests with Contractor.

- G. Failure of Contract schedule to include any element of the Work or any inaccuracy in Contract Schedule will not relieve Contractor from responsibility for accomplishing the Work in accordance with the Contract.
- H. Float Ownership:
 - 1. The Project owns the float. As such, liability for delay of the Substantial Completion Date rests with the party whose actions, last in time, actually cause delay to the Substantial Completion.
 - a. For example, if Party A uses some, but not all of the float and Party B later uses remainder of the float as well as additional time beyond the float, Party B shall be liable for the time that represents a delay to the Substantial Completion Date.
 - b. Under this scenario, Party A would not be responsible for the time since it did not consume all of the float and additional float remained; therefore, the Substantial Completion Date was unaffected.
- I. Progress Schedule shall be the basis for evaluating job progress, payment requests, and time extension requests. Responsibility for developing Contract schedule and monitoring actual progress as compared to Progress Schedule rests with Contractor.
- J. Failure of Progress Schedule to include any element of the Work or any inaccuracy in Progress Schedule will not relieve Contractor from responsibility for accomplishing the Work in accordance with the Contract. The County of Monterey's acceptance of Schedule shall be for its use in monitoring and evaluating job progress, payment requests, and time extension requests, and shall not, in any manner, impose a duty of care upon the County of Monterey or act to relieve Contractor of its responsibility for means and methods of construction.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

1.3 ORIGINAL CPM SCHEDULE

- A. Within thirty (30) calendar days after the Notice to Proceed date, submit a detailed proposed Original CPM Schedule presenting an orderly and realistic

plan for completion of the Work, in conformance with requirements as specified herein.

- B. Contract schedule shall furnish or comply with following requirements:
1. Time-scaled CPM schedule.
 2. No activity on schedule shall have duration longer than fifteen (15) workdays, with exception of submittal, approval, fabrication and procurement activities, unless otherwise approved by the Architect.
 - a. Activity durations shall be total number of actual work days required to perform that activity excluding consideration of weather impact on completion of that activity.
 3. Procurement of major equipment, through receipt and inspection at jobsite, identified as a separate activity.
 4. District furnished materials and equipment, if any, identified as separate activities.
 5. Dependencies (or relationships) between activities.
 6. Processing/approval of submittals and shop drawings for all Contract-required material and equipment. Activities that are dependent on submittal acceptance or material delivery shall not be scheduled to start earlier than expected acceptance or delivery dates.
 - a. The duration for review and approval of submittals and shop drawings shall be as specified in Section 013300, Submittal Procedures. Contractor shall be responsible for all impacts resulting from resubmittal of shop drawings and submittals.
 7. Twenty (20) workdays for developing punch list(s), completion of punch list items, and final clean-up for the Work or any designated portion thereof.
 - a. No other activities shall be scheduled during this period.
 8. Interface with the Work of other contractors (and agencies such, as but not limited to, utility companies).
 9. Show detailed Subcontractor Work activities.
 10. Activity durations shall be in Work days.

- C. Adjustments to Original CPM Schedule: Within fourteen (14) calendar days after receipt of the Architect's response to the Contractor's Original CPM Schedule, the Contractor shall have adjusted the Original CPM Schedule submittal to address all review comments and resubmit for the Architects review.
1. The Architect, within ten (10) calendar days from date that Contractor submitted the revised schedule, will either (1) accept schedule as submitted, or (2) advise Contractor in writing to review any part or parts of schedule which either do not meet Contract requirements or are unsatisfactory for the Architect to monitor Project's progress, resources and status or evaluate monthly payment request by Contractor.
 2. The Architect may accept schedule with conditions. At the first monthly meeting the CPM schedule update shall be revised to correct deficiencies identified.
 3. When schedule is accepted, it shall be considered as the "Original CPM Schedule" which will then be immediately updated to reflect the current status of the work.
 4. The Architect reserves right to require the Contractor to adjust, add to, or clarify any portion of schedule which may later be discovered to be insufficient for monitoring of Work or approval of partial payment requests. No additional compensation will be provided for such adjustments, additions, or clarifications.
- D. Acceptance: Acceptance of Contractor's schedule by the Architect will be based solely upon schedule's compliance with Contract requirements.
1. By way of Contractor assigning activity durations and proposing sequence of Work, Contractor agrees to utilize sufficient and necessary management and other resources to perform work in accordance with the schedule.
 2. Upon submittal of schedule update, updated schedule shall be considered "current" CPM schedule.
 3. Submission of Contractor's schedule to the Architect shall not relieve Contractor of total responsibility for scheduling, sequencing, and pursuing Work to comply with requirements of Contract Documents, including adverse effects such as delays resulting from ill-timed work.
- E. Submittal of Original CPM Schedule, and subsequent schedule updates, shall be understood to be Contractor's representation that the Schedule meets

requirements of Contract Documents and that Work shall be executed in sequence indicated on the schedule.

- F. Contractor shall distribute Original CPM Schedule to Subcontractors for review and acceptance.

1.4 MONTHLY CPM SCHEDULE UPDATE SUBMITTALS

- A. Following acceptance of Contractor's Original CPM Schedule, Contractor shall monitor progress of Work and adjust schedule each month to reflect actual progress and any anticipated changes to planned activities.
 - 1. Each schedule update submitted shall be complete, including all information requested for the Original CPM Schedule submittal.
 - 2. Each update shall continue to show all work activities including those already completed.
 - 3. These completed activities shall accurately reflect "as built" information by indicating when activities were actually started and completed.
 - 4. Within seven (7) calendar days of receipt of above noted update, the Architect will either accept or reject monthly schedule update submittal.
 - a. If accepted, percent complete shown in monthly update will be basis for Application for Payment by the Contractor. The schedule update shall be submitted as part of the Contractor's Application for Payment.
 - b. If rejected, update shall be corrected and resubmitted by Contractor before the Application for Payment is submitted.

1.5 SCHEDULE REVISIONS

- A. Updating the Schedule to reflect actual progress shall not be considered revisions to the Schedule. Since scheduling is a dynamic process, revisions to activity durations and sequences are expected on a monthly basis.
- B. If the Contractor's revision is not accepted by the Architect, and the Contractor disagrees with the Architect's position, the Contractor has seven (7) calendar days from receipt of the Architect's letter, to provide a written narrative explaining its position. If the Architect still does not agree with the Contractor's position, the Architect's position shall govern, and the schedule shall be updated in accordance with the Architect's request. The Contractor's

failure to respond in writing within seven (7) calendar days shall be contractually interpreted as acceptance of the Architect's position, and the Contractor waives its rights to subsequently dispute or file a claim regarding the Architect's position.

- C. At the Architect's discretion, the Contractor can be required to provide subcontractor certifications for revisions affecting said subcontractors.

1.6 RECOVERY SCHEDULE

- A. If the Schedule Update shows a substantial completion date fourteen (14) calendar days beyond the Contract Substantial Completion date, the Contractor shall submit to the Architect the proposed revisions to recover the lost time within seven (7) calendar days. As part of this submittal, the Contractor shall provide a written narrative for each revision made to recapture the lost time.
- B. If the Contractor's revisions are not accepted by the Architect, the Contractor shall follow the procedures in Paragraph 1.4, above.
- C. At the Architect's discretion, the Contractor can be required to provide subcontractor certifications for revisions affecting said subcontractors.

1.7 TIME IMPACT EVALUATION FOR CHANGE ORDERS, AND OTHER DELAYS

- A. When the Contractor is directed to proceed with changed work, the Contractor shall prepare and submit, within fourteen (14) calendar days from the direction to proceed, a Time Impact Evaluation (TIE) which includes both a written narrative and a schedule diagram depicting how the changed work affects other schedule activities. The schedule diagram shall show how the Contractor proposes to incorporate the changed work in the schedule, and how it impacts the current schedule update critical path. The Contractor is also responsible for requesting time extensions based on the TIE's impact on the critical path. The diagram must be tied to the main sequence of schedule activities to enable the County of Monterey to evaluate the impact of changed work to the scheduled critical path.
- B. The Contractor shall be required to comply with the requirements of Paragraph 1.6A, above, for all types of delays such as, but not limited to, Contractor/Subcontractor delays, adverse weather delays, strikes, procurement delays, fabrication delays, and so on.
- C. The Contractor shall be responsible for all costs associated with the preparation of Time Impact Evaluations, and the process of incorporating them into the current schedule update.

- D. Once agreement has been reached on a TIE, the Contract Times will be adjusted accordingly. If agreement is not reached on a TIE, the Contract Times may be extended in an amount the County of Monterey allows, and the Contractor may submit a claim for additional time claimed by contractor.

1.8 TIME EXTENSIONS

- A. The Contractor is responsible for requesting time extensions for time impacts that, in the opinion of the Contractor, impact the critical path of the current schedule update. Notice of time impacts shall be given in accordance with Article 4 and 8 of the Contract General Conditions (refer to AIA Document A201-1997, included in Part A of this book).
- B. Where an event for which the County of Monterey is responsible impacts the projected Substantial Completion date, the Contractor shall provide a written mitigation plan, including a schedule diagram, which explains how (for example, increase crew size, overtime, and so on) the impact can be mitigated. The Contractor shall also include a detailed cost breakdown of the labor, equipment and material the Contractor would expend to mitigate the County of Monterey caused time impact. The Contractor shall submit its mitigation plan to the County of Monterey within fourteen (14) calendar days from the date of discovery of said impact. The Contractor is responsible for the cost to prepare the mitigation plan.
- C. Failure to request time, provide TIE, or provide the required mitigation plan will result in Contractor waiving its right to a time extension and cost to mitigate the delay.
- D. No time will be granted under this Contract for cumulative effect of changes.
- E. The County of Monterey not be obligated to consider any time extension request unless requirements of Contract Documents are complied with.
- F. Failure of the Contractor to perform in accordance with the current schedule update shall not be excused by submittal of time extension requests.
- G. If the Contractor does not submit a TIE within the required fourteen (14) calendar days for any issue, it is mutually agreed that the Contractor does not require a time extension for said issue.
- H. The County of Monterey will grant day-for-day non-compensable time extensions for delays to the critical path due to inclement weather.

2.0 PRODUCTS

- A. Not applicable to this Section.

Project: 855 East Laurel Drive Emergency Shelter
Project No. 8875
Bid No. 10736

3.0 EXECUTION

A. Not applicable to this Section.

END OF SECTION

SECTION 013300 - SUBMITTAL PROCEDURES

1.0 GENERAL

1.1 SUMMARY

- A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- B. This Section describes general requirements for submittals for the work specified in these Contract Documents.
 - 1. Procedures.
 - 2. Safety Plan.
 - 3. Progress Schedule.
 - 4. Shop Drawings.
 - 5. Samples.
 - 6. Quality Control Submittals.
 - a. Design Data.
 - b. Test Reports.
 - c. Certificates.
 - d. Manufacturers' Instructions.
 - 7. Operations and Maintenance Manuals.
 - 8. Project Record Documents.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 011000 - Summary of Work
- C. Section 012100 - Project Control System

- D. Section 012200 - Unit Prices: Measurement and Payment
- E. Section 012600 - Modification Procedures
- F. Section 017700 - Contract Closeout Procedures

1.3 PROCEDURES

- A. Provide all submittals through Procore
- B. Submit at own expense Schedule of Shop Drawing and Sample Submittals, Safety Plans, Progress Schedule, Product Data, Shop Drawings, Samples, Operations and Maintenance Manuals, and Project Record Documents required by the Contract Documents.
- C. Transmit each item with a standard letter of transmittal in form approved by Architect.
- D. Identify project, Contractor, subcontractor, major supplier, pertinent drawing sheet and data number, and specification Section number as appropriate. Provide space for Contractor and Architect review stamps.
- E. Where manufacturer's standard drawings or data sheets are used, they shall be marked clearly show those portions of the data which are applicable to this project.
- F. Submit Shop Drawings, Samples and other submittals to Architect for review and approval in accordance with accepted Contract Schedule. If no such schedule is agreed upon, then all Shop Drawing, Samples and product data submittals shall be completed within thirty (30) days after receipt of Notice to Proceed from the County of Monterey. The data shown on the Shop Drawings shall be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to show Architect the materials and equipment Contractor proposes to provide and to enable Architect to review the information for the limited purposes specified below. Samples shall be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which it is intended and otherwise as Architect may require to enable Architect to review the submittal. The number of each Sample to be submitted will be as specified in the Specifications.
- G. At the time of each submission, Contractor shall give Architect specific written notice of all variations, if any, that the Shop Drawing or Sample submitted may have from the requirements of the Contract Documents, and the reasons therefore. This written notice shall be in a written communication separate from the submittal. In addition, Contractor shall cause a specific notation to be made on each Shop Drawing and Sample submitted to Architect

for review and approval of each such variation. If the County of Monterey accepts deviation, the District shall issue appropriate Contract Modification.

- H. Submittal coordination and verification is responsibility of Contractor; this responsibility shall not be delegated in whole or in part to subcontractors or suppliers. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:
1. All field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar information with respect thereto;
 2. All materials with respect to intended use, fabrication, shipping, handling, storage assembly and installation pertaining to the performance of the Work;
 3. All information relative to Contractor's sole responsibilities and of means, methods techniques, sequences and procedures of construction and safety precautions and programs incident thereto.
- I. Contractor shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.
- J. Contractor's submission to Architect of a Shop Drawing or Sample submittal will constitute Contractor's representation that it has satisfied its obligations under the Contract Documents, and as set forth immediately above, with respect to Contractor's review and approval of that submittal.
- K. Designation of work "by others," if shown in submittals, shall mean that work will be responsibility of Contractor rather than subcontractor or supplier who has prepared submittals.
- L. After review by Architect of each of Contractor's submittals, one of set of duplicates of material will be returned to Contractor with actions defined as follows:
1. APPROVED - Accepted subject to its compatibility with future submittals and additional partial submittals for portions of the work not covered in this submittal. Does not constitute approval or deletion of specified or required items not shown on the submittal.
 2. APPROVED AS NOTED (NO RESUBMISSIONS REQUIRED) - Same as 1 above, except that minor corrections as noted shall be made by Contractor.

3. REVISE AND RESUBMIT - Rejected because of major inconsistencies or errors which shall be resolved or corrected by Contractor prior to subsequent review by Architect.
 4. REJECTED - RESUBMIT - Submitted material does not conform to Plans and Specifications in major respect, that is, wrong size, model, capacity, or material.
- M. It is considered reasonable that Contractor shall make a complete and acceptable submittal at least by second submission. The County of Monterey reserves the right to deduct monies from payments due Contractor to cover additional costs of Architect's review beyond the second submission. Illegible submittals will be rejected and returned to Contractor for resubmission.
- N. Favorable review will not constitute acceptance by the County of Monterey or Architect of any responsibility for the accuracy, coordination and completeness of the submittals.
- O. Accuracy, coordination, and completeness of Submittals shall be sole responsibility of Contractor, including responsibility to backcheck comments, corrections, and modifications from the County of Monterey's or Architect's review before fabrications. Submittals may be prepared by Contractor, subcontractors, or suppliers, but Contractor shall ascertain that submittals meet requirements of Contract Documents, while conforming to structural space and access conditions at point of installation. Architect's review will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Favorable review of submittal, method of work, or information regarding materials and equipment Contractor proposes to furnish shall not relieve Contractor of responsibility for errors therein and shall not be regarded as assumption of risks or liability by Architect or the County of Monterey, or any officer or employee thereof, and Contractor shall have no claim under Contract on account of failure or partial failure or inefficiency or insufficiency of any plan or method of work or material and equipment so accepted. Favorable review shall be considered to mean merely that Project Management or the County of Monterey has no objection to Contractor using, upon his own full responsibility, plan or method of work proposed, or furnishing materials and equipment proposed.
- P. Architect's review will not extend the means, methods, techniques, sequences or procedures of construction or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

- Q. Submit complete initial submittal for those items where required by individual specification Sections. Complete submittal shall contain sufficient data to demonstrate that items comply with Specifications, shall meet minimum requirements for submissions cited in technical specifications, shall include motor data and seismic anchorage certifications, where required, and shall include necessary revisions required for equipment other than first named. If Contractor submits incomplete initial submittal, when complete submittal is required, submittal may be returned to Contractor without review.
- R. It shall be Contractor's responsibility to copy, conform and distribute reviewed submittals in sufficient numbers for Contractor's files, subcontractors and vendors.
- S. After Architect review of submittal, revise and resubmit as required. Identify changes made since previous submittal.
 - 1. Begin no fabrication or work which require submittals until return of submittals not requiring resubmittal.
 - 2. Normally, submittals will be processed and returned to Contractor within [15] working days of receipt.
- T. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report any inability to comply with provisions.

1.4 SAFETY PLAN

- A. Submit Safety Plan specific to this Contract to Architect within fifteen (15) calendar days after Start Date of the Contract Times.
- B. Electronic copy of accepted Safety Plan will be returned to Contractor.
- C. No on-site work shall be started until Safety Plan has been reviewed and accepted by Architect and/or Local Building Official. Acceptance of Safety Plan shall not affect Contractor's responsibility for maintaining a safe working place and instituting safety programs in connection with project.

1.5 PROGRESS SCHEDULE

- A. See Section 013200, Construction Progress Documentation: Schedules and Reports, for schedule and report requirements.
- B. Submit an electronic copy of schedule at each of the following times:
 - 1. Original CPM (Critical Path Method) Schedule within thirty (30) days of the Notice to Proceed.

2. Adjustments to the CPM Schedule as required.
 3. CPM Schedule updates monthly, five (5) days prior to monthly progress meeting.
- C. Progress Schedules and Reports shall be submitted through Procore.

1.6 SHOP DRAWINGS

- A. All Shop Drawings shall be submitted through Procore.
- B. Minimum Sheet Size: 8-1/2 inches by 11 inches. All others: Multiples of 8-1/2 inches by 11 inches, 34 inches by 44 inches maximum.
- C. Original electronic copy will be marked with Architect's review comments and returned to Contractor.
- D. Mark each copy to identify applicable Products, models, options, and other data; supplement manufacturers' standard data to provide information unique to Work.
- E. Include manufacturers' installation instructions when required by specification Section.

1.7 SAMPLES

- A. Submit full range of manufacturers' standard colors, textures, and patterns for Architect's selection.
- B. Submit samples to illustrate functional and aesthetic characteristics of Product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work.
- C. Include identification on each sample, giving full information.
- D. Submit two (2) samples unless otherwise specified. One (1) will be retained.
- E. Sizes: Unless otherwise specified, provide the following:
 1. Paint Chips: Manufacturers' standard.
 2. Flat or Sheet Products: Minimum 6 inches square, maximum 12 inches square.
 3. Linear Products: Minimum 6 inches, maximum 12 inches long.

4. Bulk Products: Minimum 1 pint, maximum 1 gallon.
- F. Full size samples may be used in Work upon approval.
- G. Mock-ups:
1. Erect field samples and mock-ups at Project site in accordance with requirements of specification Sections.
 2. Modify or make additional field samples and mock-ups as required to provide appearance and finishes approved by Architect.
 3. Approved field samples and mock-ups may be used in Work upon approval.

1.8 QUALITY CONTROL SUBMITTALS

- A. All Quality Control Documents shall be submitted through Procore.
- B. Design Data: N/A.
- C. Test Reports: Original electronic copy will be marked with Architect's review comments and returned to Contractor.
1. Indicate that material or product conforms to or exceeds specified requirements.
 2. Reports may be from recent or previous tests on material or product, but must be acceptable to Architect. Comply with requirements of each individual specification Section.
- D. Certificates: Original electronic copy will be marked with Architect's review comments and returned to Contractor.
1. Indicate that material or product conforms to or exceeds specified requirements.
 2. Submit supporting reference data, affidavits, and certifications as appropriate.
 3. Certificates may be recent or from previous test results on material or product, but must be acceptable to Architect.
- E. Manufacturers' Instructions: Original electronic copy will be marked with Architect's review comments and returned to Contractor.

1. Include manufacturer's printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing.
2. Identify conflicts between manufacturer's instructions and Contract Documents.

1.9 OPERATIONS AND MAINTENANCE MANUALS

- A. Submit electronic copies of manufacturers' operations and maintenance manuals. If necessary, original electronic copy will be marked with Architect's review comments and returned to Contractor for correction until satisfactory information is provided. The County of Monterey will retain satisfactorily corrected manuals for its own use.
- B. Submit all Manuals through Procore.
- C. Operations and maintenance manuals shall include the following as appropriate:
 1. Operating instructions.
 2. Preventive maintenance instructions.
 3. Cleaning instructions.
 4. Safety precautions.
 5. Trouble shooting procedures.
 6. Theory of operation to discrete component level.
 7. Schematic diagrams, flow diagrams, wiring diagrams, logic diagrams, and so on, to discrete component level.
 8. Parts lists showing all discrete components with part number, current prices and availability.
 9. List of replaceable supplies; paper, ink, ribbon, etc. with part numbers, current prices and availability.
 10. Recommended levels of spare parts and supplies to keep on hand.
 11. Manufacturers' service and maintenance technical manuals.
 12. Names, addresses and telephone numbers of service and repair firms for the equipment.

- D. Manuals shall be the same as are used by manufacturers' authorized technicians to completely service and repair the equipment.

1.10 PROJECT RECORD DOCUMENTS

- A. Submit one copy of each of the Project Record Documents listed in Section 017700 - Contract Closeout Procedures.

1.11 DELAY OF SUBMITTALS

- A. Delay of submittals by Contractor is considered avoidable delay. Liquidated damages incurred because of late submittals will be assessed to Contractor.

2.0 PRODUCTS

- A. Not applicable to this Section.

3.0 EXECUTION

- A. Not applicable to this Section.

END OF SECTION

SECTION 017400 - CONSTRUCTION CLEANING & WASTE MANAGEMENT

1.0 GENERAL

1.1 SUMMARY

- A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- B. This Section includes the following:
 - 1. Waste Management Goals
 - 2. Waste Management Plans
 - 3. Waste Management Plan Implementation
 - 4. Special Programs

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 011000 - Summary of Work
- C. Section 013119 - Project Meetings
- D. Section 013300 - Submittals
- E. Section 017700 - Contract Closeout Procedures

1.3 REFERENCES

- A. County Of Santa Clara Recycling and Waste Reduction Division

1.4 DEFINITIONS

- A. Construction and Demolition Waste: Solid wastes such as building materials, packaging and rubble resulting from construction, remodeling, demolition and repair of buildings/facilities, paving and infrastructure.

- B. Recyclable Materials: Products and materials that can be recovered and manufactured into new products. Recyclable materials include, but are not limited to, the following:
1. Asphaltic paving
 2. Portland cement concrete
 3. Brick and masonry
 4. Land-clearing debris
 5. Native rock and granular fill
 6. Wood products
 7. Ferrous materials
 8. Non-Ferrous metals including copper and aluminum
 9. Mechanical and electrical products and equipment
 10. Gypsum products
 11. Acoustical ceiling tile
 12. Cardboard and plastic film
 13. Office recycling, including paper, glass, plastic and cans
 14. Carpet and padding
 15. Oil used for equipment
 16. Fluorescent lights and ballasts
 17. Batteries
- C. Recycling Facility: A business that specializes in collecting, handling, processing, distributing, or remanufacturing waste materials, generated by demolition and new construction projects, into products or materials that can be used for this project or by others.
1. As recommend by Monterey County

- D. Trash: Product or material unable to be salvaged for resale, salvaged and reused, returned, or recycled.
- E. Waste Materials: Product or material that can be salvaged for resale, salvaged and reused, returned to vendors, or recycled.

1.5 PERFORMANCE REQUIREMENT

- A. The Contractor shall use all means available to divert at least 75% construction and demolition waste from landfills.

1.6 CONSTRUCTION WASTE MANAGEMENT OPERATIONS

- A. Take a proactive, responsible role in management of construction waste and require all subcontractors, vendors and suppliers to participate in the effort. Establish a construction waste management program that includes the following categories:
 - 1. Waste prevention including minimizing packaging waste
 - 2. Salvage and reuse
 - 3. Salvage for resale and donation
 - 4. Recycling
 - 5. Disposal
- B. Encourage waste prevention practices as an efficient waste management strategy when sizing, cutting, and installing products and materials. Salvage and reuse is a better waste management method than recycling because little or no reprocessing is necessary; less pollution is created when items are reused in their original form. Therefore a diligent effort shall be made to salvage and reuse product and materials. Waste materials that cannot be salvaged and reused yet have value as recyclables, shall be recycled. Only trash shall be transported to a landfill.

1.7 CONSTRUCTION WASTE MANAGEMENT PLAN

- A. Perform a waste analysis to determine the types and quantity of construction waste anticipated and identify salvage for resale, salvage and reuse, recycling, and disposal options available. Within 10 days after contract award and prior to performing any demolition work, submit a Waste Management Plan for review and approval. The Waste Management Plan shall include the following:

1. Waste Materials: A list of waste materials that will be salvaged for resale, salvaged and reused, and recycled. A list to address packaging materials including banding, crates, pallets, plastic film, polystyrene and cardboard (packaging waste consumes 15% of the waste stream).
2. Haulers: Name, address and phone number for each hauler providing service.
3. Facilities: Identification of each recycling facility to be utilized.
4. Separation and Protection: Description of the method to be employed in handling waste materials and description of the method that will be used to protect recycled materials from contamination.
5. Transportation: Description of the means of transportation of waste materials and the destination of the materials.
6. Subcontractor Participation: A description of requirements for subcontractors to adhere to that includes waste prevent measures such as salvage for resale or reuse and recycling for the waste materials generated by each subcontractor's scope of work, including packaging and shipping materials.
7. Meetings: A description of the regular meetings held in which waste management will be addressed. Refer to Section 013119, Project Meetings.

2.0 PRODUCTS

Not Used.

3.0 EXECUTION

3.1 PROGRAM IMPLEMENTATION AND MONITORING

- A. Implement and maintain, for the duration of the project, the construction waste management program.
 1. Manager: The Contractor shall designate an onsite party (or parties) responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project.
 2. Distribution: The Contractor shall distribute copies of the Waste Management Plan to the Contractor, each Subcontractor, the County of Monterey, and Architect.

3. Instruction: The Contractor shall provide onsite instruction of appropriate separating, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
4. Separation Facilities: The Contractor shall lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, and return. Provide a site map that calls out areas identified. Provide the necessary containers and bins to facilitate the waste management program. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials. Separate construction waste at the project site by one of the following methods:
 - a. Source Separated Method: Waste products and materials that are recyclable are separated from trash and sorted into appropriately marked separate containers and then transported to the respective recycling facility for further processing. Trash is transported to a landfill.
 - b. Co-Mingled Method: Selected waste materials are placed into a single container and then transported to a recycling facility where the recyclable materials are sorted and processed and the remaining trash and waste materials are handled separately.
 - c. Other methods proposed by the Contractor and approved by the Contracting Officer.

END OF SECTION

SECTION 017700 - CONTRACT CLOSEOUT PROCEDURES

1.0 GENERAL

1.1 SUMMARY

- A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- B. This Section describes contract closeout procedures including:
 - 1. Removal of temporary construction facilities.
 - 2. Substantial completion.
 - 3. Final completion.
 - 4. Final cleaning.
 - 5. Project record documents.
 - 6. Material, equipment and finish data.
 - 7. Project guarantee
 - 8. Warranties
 - 9. Turn-in.
 - 10. Release of claims.
 - 11. Guaranty and Maintenance Bonds

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

1.3 REMOVAL OF TEMPORARY CONSTRUCTION FACILITIES

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

- B. Clean and repair damage caused by installation or use of temporary facilities.
- C. Restore permanent facilities used during construction to specified condition.

1.4 SUBSTANTIAL COMPLETION

- A. When Contractor considers Work or designated portion thereof is substantially complete, submit written notice, with list of items to be completed or corrected.
- B. Within reasonable time, Architect will inspect to determine status of completion.
- C. Should Architect determine that Work is not substantially complete, Architect will promptly notify Contractor in writing, listing all defects and omissions.
- D. Remedy deficiencies and send a second written notice of substantial completion. Architect will re-inspect the Work.
- E. When Architect determines that Work is substantially complete, Architect will issue a Certificate of Substantial Completion.
- F. Manufactured units, equipment and systems which require startup must have been started up and run for periods prescribed by Architect before a Certificate of Substantial Completion will be issued.

1.5 FINAL COMPLETION

- A. When Contractor considers Work is complete, submit written certification that:
 - 1. Contractor has inspected Work for compliance with Contract Documents.
 - 2. Work, except for Contractor maintenance after Final Acceptance, has been completed in accordance with Contract Documents and deficiencies listed with Certificate of Substantial
 - 3. Completion has been corrected.
 - 4. Work is complete and ready for final inspection.
- B. In addition to submittals required by conditions of Contract, provide submittals required by governing authorities and submit final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.
- C. When Architect finds Work is acceptable and final submittal is complete, Architect will issue final change order reflecting approved adjustments to Contract Sum not previously made by Change Order.

1.6 FINAL CLEANING

- A. Execute final cleaning prior to final inspection.
- B. Clean interior and exterior surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
 - 1. Clean equipment and fixtures to a sanitary condition, clean or replace filters of mechanical equipment operated during construction, clean ducts, blowers and coils of units operated without filters during construction.
 - 2. Employ skilled workers for final cleaning.
- C. Clean Site; mechanically sweep paved areas.
- D. Remove waste and surplus materials, rubbish, and construction facilities from Site.

1.7 PROJECT GUARANTEE

- A. Requirements for Contractor's guarantee of completed Work are included in Warranty from General Conditions of the Contract for Construction. Contractor shall guarantee Work done under Contract against failures, leaks or breaks or other unsatisfactory conditions due to defective equipment, materials or workmanship, and perform repair work or replacement required, at Contractor's sole expense, for period of [1] year from date of Final Acceptance.
- B. Neither recordation of final acceptance nor final certificate for payment nor provision of the Contract nor partial or entire use or occupancy of premises by the County of Monterey shall constitute acceptance of Work not done in accordance with Contract Documents nor relieve Contractor of liability in respect to express warranties or responsibility for faulty materials or workmanship.
- C. The County of Monterey may make repairs to defective Work as set forth in Warranty from General Conditions of the Contract for Construction, if, within 5 working days after mailing of written notice of defective work to Contractor or authorized agent, Contractor shall neglect to make or undertake with due diligence repairs; provided, however, that in case of leak or emergency where, in opinion of the County of Monterey, delay would cause hazard to health or serious loss or damage, repairs may be made without notice being sent to Contractor, and Contractor shall pay cost thereof.
- D. If, after installation, operation or use of materials or equipment to be furnished under Contract proves to be unsatisfactory to Architect, the County of Monterey shall have right to operate and use materials or equipment until it can, without damage to the County of Monterey, be taken out of service for correction or

replacement. Period of use of defective materials or equipment pending correction or replacement shall in no way decrease guarantee period required for acceptable corrected or replaced items of materials or equipment.

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

1.8 WARRANTIES AND BONDS

- A. Execute Contractor's submittals and assemble documents executed by subcontractors, suppliers, and manufacturers.
 - 1. Provide table of contents and assemble in a single electronic file.
 - 2. Assemble in Specification Section order.
 - 3. Submit through Procore.
- B. Submit material prior to final application for payment.
 - 1. For equipment put into use with the County of Monterey's permission during construction, submit within ten (10) working days after first operation.
 - 2. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten (10) working days after acceptance, listing date of acceptance as start of warranty period.
- C. Warranties are intended to protect the County of Monterey against failure of work and against deficient, defective and faulty materials and workmanship, regardless of sources.
- D. Limitations: Warranties are not intended to cover failures which result from the following:
 - 1. Unusual or abnormal phenomena of the elements.
 - 2. Vandalism after substantial completion.

3. Insurrection or acts of aggression including war.
- E. Related Damages and Losses: Remove and replace Work which is damaged as result of defective Work, or which must be removed and replaced to provide access for correction of warranted Work.
 - F. Warranty Reinstatement: After correction of warranted Work, reinstate warranty for corrected Work to date of original warranty expiration or to a date not less than 365 days after corrected Work was done, whichever is later.
 - G. Replacement Cost: Replace or restore failing warranted items without regard to anticipated useful service lives.
 - H. Warranty Forms: Submit drafts to Architect for approval prior to execution. Forms shall not detract from or confuse requirements or interpretations of Contract Documents.
 1. Warranty shall be countersigned by manufacturers.
 2. Where specified, warranty shall be countersigned by subcontractors and installers.
 - I. Rejection of Warranties: the County of Monterey reserves right to reject unsolicited and coincidental product warranties which detract from or confuse requirements or interpretations of Contract Documents.
 - J. Term of Warranties: For materials, equipment, systems and workmanship warranty period shall be two (2) years minimum from date of substantial completion of entire Work except where:
 1. Detailed specifications for certain materials, equipment or systems require longer warranty periods.
 2. Materials, equipment or systems are put into beneficial use the County of Monterey prior to Substantial Completion as agreed to in writing by Architect.
 - K. Warranty of Title: No material, supplies, or equipment for Work under Contract shall be purchased subject to any chattel mortgage, security agreement, or under a conditional sale or other agreement by which an interest therein or any part thereof is retained by seller or supplier. Contractor warrants good title to all material, supplies, and equipment installed or incorporated in Work and agrees upon completion of all work to deliver premises, together with improvements and appurtenances constructed or placed thereon by Contractor, to the County of Monterey free from any claim, liens, security interest, or charges, and further agrees that neither Contractor nor any person, firm, or corporation furnishing any

materials or labor for any Work covered by Contract shall have right to lien upon premises or improvement or appurtenances thereon. Nothing contained in this Paragraph, however, shall defeat or impair right of persons furnishing materials or labor under bond given by Contractor for their protection or any rights under law permitting persons to look to funds due Contractor in hands of the County of Monterey.

1.9 TURN-IN

- A. Contract will not be closed out and final payment will not be made until all personnel Identification Media, vehicle permits and keys issued to Contractor during prosecution of Work are turned in to the Salinas Emergency Shelter.

2.0 PRODUCTS

- A. Not applicable to this Section.

3.0 EXECUTION

- A. Not applicable to this Section.

END OF SECTION

SECTION 018119 – CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT

1.0 GENERAL

1.1 SUMMARY

- A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- B. This Section includes procedures for achieving an environmentally conscious Work Product. The Contractor shall:
 - 1. Prepare a Construction Indoor Air Quality Management Plan (IAQ) in accordance with this Section (refer to parts 1.2 and 1.3 below).
 - 2. Adhere to the methods and procedures outlined in the Construction IAQ during construction and closeout.
 - 3. Document compliance with the Construction IAQ during construction.
 - 4. Submit certification to the County at closeout demonstrating compliance with the Construction IAQ requirements.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

1.3 SPECIAL SUBMITTAL REQUIREMENTS

- A. Construction Indoor Air Quality Management Plan (IAQ): Not less than 21 days prior to installation of HVAC ductwork or equipment, or application of coatings, sealants and/or finishes inside the enclosed building shell.
- B. Revise and resubmit IAQ as required by the County of Monterey or Architect.
 - 1. Approval of the Contractor's Environmental Procedures Compliance plans will not relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures required by Federal, state, county or local agencies.

1.4 PROVIDE A CONSTRUCTION IAQ MANAGEMENT PLAN THAT INCLUDES:

- A. Procedures for meeting the applicable SMACNA (Sheet Metal and Air Conditioning National Design/Builders Association) Construction IAQ requirements.
- B. Procedures for protection and remediation plans for damaged absorptive materials.
- C. Training sessions for all contractors and subcontractors that they understand and agree to comply with the Construction IAQ Management Plan requirements.
 - 1. Schedule and sequence of events for HVAC system installation/startup, application of interior coatings and finishes, and installation of building furnishings.

2.0 PRODUCTS

- A. Not Applicable to this Section.

3.0 EXECUTION

3.1 DURING CONSTRUCTION THE CONTRACTOR SHALL:

- A. Meet or exceed the applicable minimum requirements of the current SMACNA and the IAQ Guidelines for Occupied Buildings Under Construction, Chapter 3, for the items listed below which the contractor shall supply during construction:
 - 1. HVAC Protection:
 - a. Protect all air handling and distribution equipment, and air supply and return ducting during construction.
 - b. Adequately cover and protect all exposed air inlet and outlet openings, grilles, ducts, plenums, etc., to prevent water, moisture, dust, and other contaminant intrusion.
 - c. Apply protection immediately after installation of equipment and ducting.
 - d. Ducting runs that require more than a single day to install shall be protected at the end of each day's Work.
 - 2. Source Control:

- a. Protect stored onsite or installed absorptive or porous materials including, but not limited to, batt insulation, drywall, and carpeting from exposure to moisture.
 - b. Do not use moisture-damaged porous materials in the building.
 - c. Provide adequate ventilation of packaged dry products prior to installation to allow for gassing of volatile organic compounds (VOCs). Remove from packaging and ventilate in a secure, dry, well-ventilated space free from strong contaminant sources and residues. Provide a temperature range of 60 degrees F minimum to 90 degrees F maximum continuously during the ventilation period. Do not ventilate within limits of Work unless otherwise approved by the Architect.
3. Housekeeping:
- a. Minimize accumulation of dust fumes, vapors, or gases in the building.
 - b. Suppress dust with wetting agents or a sweeping compound.
 - c. Clean up dust using a wet rag or damp mop.
 - d. Increase the cleaning frequency when dust buildup is noted.
 - e. Remove spills or excess applications of solvent-containing products as soon as possible.
 - f. Remove accumulated water and keep work areas as dry as possible.
 - g. Vacuum using HEPA-filtered vacuum cleaners.
 - h. Store volatile liquids, including fuels and solvents, in closed containers and outside of the building when not in use.
 - i. Keep volatile liquid containers closed when the container is inside of the building and not in use.
4. Scheduling:
- a. Develop schedule for application of interior finishes including time frames for the application of wet materials onto dry materials, dry materials onto wet materials, and expected curing times for applied wet materials.

- b. Schedule application of wet material floor coverings, wall coverings, and other porous finish materials after activation of building HVAC and exhaust systems.
 - c. Wet materials include all paints, adhesives, sealants, coatings, finishes and spray-applied materials.
 - d. Insure that all wet applied interior finish materials are properly and fully cured before installing other finish materials over them.
 - e. Install carpets and furnishings after all other interior finish materials have been applied and fully cured.
 - f. Provide sufficient ventilation, air circulation and air changes to properly cure materials. Run HVAC system and exhaust fans 24 hours per day during this period. Return air dampers shall be closed to provide 100% fresh air intake. Temperatures shall be maintained at approximately 75 degrees F (verify specific recommended temperature settings with coating and finish manufacturer's product data).
 - g. Provide sufficient ventilation, air circulation and air changes to dissipate excess humidity when present. Relative humidity shall not be allowed to exceed 40%.
- B. Use nontoxic cleaning materials and procedures to avoid the release of toxic fumes and VOCs into finished spaces within the building.
- C. Replace all filtration media immediately prior to occupancy.
- 1. Filtration media shall have a Minimum Efficiency Reporting Valve (MERV) of 13, as determined by ASHRAE 52.2-2007 for media installed at the end of construction.
 - 2. Provide cut sheets of filtration media used during construction and installed prior to occupancy with MERV highlighted.
 - 3. Provide a letter declaring that all filtration media was replaced prior to occupancy.
- D. During construction provide photographs of Construction IAQ management measures such as protection of ducts and onsite stored or installed absorptive materials to document compliance with the Construction IAQ management plan.

END OF SECTION

Division 3: Concrete

SECTION 031000 - CONCRETE FORMWORK

1.0 GENERAL

1.1 SECTION INCLUDES

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Furnish all labor, materials and equipment and perform all operations required to complete all formwork as indicated on the drawings and specified herein.

1.2 DESCRIPTION

- A. Work Included: Forms, shores, bracing, removal and other operations necessary for all cast in place concrete placed.
 - 1. Setting and securing into forms anchor bolts and other metal items embedded in concrete, using materials and layouts furnished and delivered to job site as specified under other sections.

1.3 QUALITY ASSURANCE

- A. Reference Standards
 - 1. ACI 347 "Recommended Practice for Concrete Formwork"
 - 2. American Plywood Association (APA)
 - 3. West Coast Lumberman's Association (WCLA)

2.0 PRODUCTS

2.1 MATERIALS

- A. Form Materials:
 - 1. Non-exposed formwork facing:

- a. For concrete which is not exposed to view, forms may be of plywood as specified for exposed surfaces, or square edge 1" x nominal Douglas Fir, Construction Grade, S4S.
- b. All exposed concrete edges shall be chamfered 1/2", or as noted on the drawings.
2. Exposed Surface Formwork Facing:
 - a. Forms for all exterior and interior concrete flat surfaces shall be new Douglas Fir Plywood (APA) 5-ply, 5/8-inch, B-B Plyform, Class I, Exterior Type, oiled and edged and edge-sealed, conforming to U.S. Product Standard PS 1-83 in large sheet sizes to achieve joint patterns shown, unless otherwise specified as board formed.
 - b. All exposed concrete edges shall be chamfered 1/2", or as noted on the drawings.
- B. Earth Forms: Earth trench forms will be allowed if soil will stand in excavations and not ravel or cave. Excavate earth forms two (2) inches wider (1" each side) than called for on the drawings each side of the foundation.
Additional concrete due to earth form and excavation required to perform the new work is at no additional cost to the district/owner.
- C. Form Coating:
 1. Form sealer: Nox-crete Form Coating, or approved equal for wood forms only.
 2. Spray-on compounds shall not affect color, bond or subsequent treatment of concrete surface.

3.0 EXECUTION

3.1 CONSTRUCTION OF FORMS

- A. General:
 1. All concrete work shall be formed to the shapes, sizes, lines and dimensions shown on the plans. Formwork shall be designed by the contractor's engineer and shall be licensed Civil or Structural engineer in the State of California.
 2. The design and engineering of the formwork, as well as its construction, shall be the responsibility of the Contractor.
 3. Schedule the work and notify other trades in ample time so that provisions for their work in the formwork can be made without delaying the progress of the project.

4. Verify that all sleeves, pipes, etc. for the electrical, plumbing, heating and ventilation work, or other work, are installed. Secure forms and provide for all openings, offsets, recessed nailing blocks, channel chases, anchors, ties, inserts, etc. in the formwork before concrete is poured.
 - a. The Architect shall be notified for a review of the formwork at least 24 hours prior to placing reinforcing steel.
 - b. Excessive deflection of forms after concrete is poured shall be sufficient cause for rejection of that portion of concrete and formwork.
 - c. Allowable deflection shall be 1/8" maximum.
 - d. Arrangements of formwork shall be properly tied, braced, shored, and supported to insure stability against pressures from any source, without failure of any component part and without excessive deflection.
- B. Proper provisions shall be made for all openings, offsets, inserts, anchorages, blocking and other features of the work as shown or required.
- C. Warped, checked or scuffed forms shall be rejected.

3.2 TREATMENT OF FORMS

- A. Contact surface of all plywood forms shall be treated with a form sealer. Treatment shall be in strict conformance with the manufacturer's specifications. The sealer to be used shall leave no residue upon the face of the concrete, nor have the effect of preventing bonding of subsequent paint or plaster coats.

3.3 FORM REMOVAL

- A. Forms shall not be removed before minimum curing period has elapsed without approved, alternate curing methods being employed.
- B. Forms shall be removed without damage to the concrete and in such a manner that will insure complete safety of the structure and without damaging exposed concrete, edges, chamfers and inserts. In no case shall they be removed until the concrete has hardened sufficiently to permit their removal with safety, and the members have attained sufficient strength to safely support the imposed loads.
- C. The minimum time for removal of forms after concrete has been poured shall be as follows:
 1. Columns and walls: 7 days, provided members are not subjected to overhead loads.

2. Footings: Side forms may be removed 24 hours after concrete is poured, if back-filled immediately, otherwise 7 days minimum.
 3. Beams, elevated slab, etc. 28 days unless adequate shoring and curing procedures are provided.
- D. The times listed above are minimum. These time periods may be extended if deemed necessary by the Architect.
- E. Concrete shall not be subjected to superimposed loads (structure or construction) until it has attained its full design strength, and not for a period of at least 14 days after placing.
- F. Concrete shall not be subjected to construction loads in excess of design loads.
- G. Re-use of plywood form is not allowed at exposed concrete surface.

END OF SECTION

SECTION 033000 – CAST-IN-PLACE CONCRETE

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install Portland cement concrete site work complete, including the following principal items:
 - 1. Concrete curbs
 - 2. Concrete slabs
 - 3. Utility trench repair

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.

1.3 SUBMITTALS FOR REVIEW

- A. Comply with Section 013300, Submittal Procedures.
- B. The Contractor's Testing Laboratory's certificate of compliance.
- C. The Contractor shall submit:
 - 1. Certified copies of mix designs for each concrete class specified including compressive strength test reports.
 - 2. Certification that materials meet requirements specified.
 - 3. Certification from vendor that samples originate from and are representative of each lot proposed for use.
- D. The Testing Agency will submit reports on tests and inspections performed to the County, the Architect and Structural Engineer, the Contractor, and the Division of the State Architect.

- E. Schedule of placing for the Construction Manager's review before starting work.

1.4 QUALITY ASSURANCE

A. Reference and Standards:

1. Perform work in accordance with all applicable laws, codes and regulations required by the State of California.
2. Reference to "Standard Specifications" shall mean the current Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, CALTRANS.
3. The American Concrete Institute (ACI): "Manual of Concrete Practice," Parts 1, 2 and 3.
4. California Code of Regulations (also known as California Building Code (CBC)), Title 24, 2007 edition, DSA/SS/AC provisions.
5. American Society for Testing and Materials (ASTM).

B. Stipulations:

1. The Contractor shall be responsible for quality of concrete in place and shall bear burden of proof that concrete meets minimum requirements. Use the same mix design for all exposed concrete.
2. Placing of concrete by means of pumping will be an acceptable method of placement providing that the Contractor can demonstrate that, specified concrete strengths will be met.

1.5 FIELD SAMPLES AND TESTS

- A. The County's representative will select a qualified testing laboratory to take samples for testing during the course of the work as considered necessary. The County will pay costs for such tests. Contractor shall cooperate in making tests and shall be responsible for notifying the designated laboratory in sufficient time to allow taking of samples at time of pour.
- B. Should tests show that concrete is below specified strength, Contractor shall remove all such concrete, as directed by the Project Inspector. Full cost of removal of low strength concrete, its replacement with concrete of proper specified strength and testing, shall be borne by Contractor.
- C. Testing Laboratory Qualifications: The Testing Laboratory shall be under direction of a Civil Engineer registered in the State of California, shall have operated successfully for four years prior to this work, and shall conform to requirements of ASTM E329.

D. All samples and testing shall conform with CBC Sections 1903.

1.6 COORDINATION

A. Coordinate items of other trades. Contractor shall be responsible for the proper installation of all accessories embedded in the concrete and for the provision of holes, openings, etc., necessary to the execution of the work of the trades.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Supply ready mixed concrete throughout. Batch, mix and transport in accordance with ASTM C-94, "Specifications for Ready Mixed Concrete."

B. Mix and deliver concrete in quantities that will permit immediate use only.

C. Indiscriminate addition of water for any reason will be cause for rejection of the load.

D. Ensure storage facilities are weather tight and dry.

E. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use.

F. Store bulk cement in bins capable of preventing exposure to moisture.

G. Use sacked cement in chronological order of delivery. Store each shipment so that it may be readily distinguishable from other shipments.

2.0 PRODUCTS

2.1 REINFORCING MATERIALS

A. Bar Reinforcement ASTM A615.

1. #3 and smaller: Grade 60.

2. #4 and larger: Grade 60.

2.2 CONCRETE CLASSES

CLASS	STRENGTH	AGGREGATE	WEIGHT	SLUMP
A	3000	3/4	145	4

A. Class: Identifies all concrete as specified.

- B. Strength: Compressive strength in psi after 28-days when tested in accordance with ASTM C39. All concrete shall develop compression strength specified in 28-days. To meet above requirements, mix shall be designed such that average compressive strength will exceed specified 28-day strength by an amount as specified by ACI 318.
- C. Aggregate: Maximum size in inches.
- D. Weight: Pounds per cubic foot, air dry.
- E. Slump: In inches when tested in accordance with ASTM C143.

2.3 CONCRETE MATERIALS

- A. General Requirements:
 - 1. Cement and aggregates shall have proven history of successful use with one another. Sources of cement and aggregate shall remain unchanged throughout work unless the Architect and Structural Engineer approves request for change made at least 10-days prior to anticipated date of casting.
 - 2. Ready-mixed concrete shall meet requirements of ASTM C94.
 - 3. Deviations in properties of materials tested by Testing Agency shall be cause for their rejection pending additional test results and redesign of mix.
 - 4. No frozen aggregates will be permitted.
- B. Cements:
 - 1. ASTM C150, Type II. Use one brand of cement throughout project unless otherwise acceptable to Architect and Structural Engineer.
 - 2. Maximum water/cement ratio of 0.50 for all cast-in-place concrete.
- C. Fly Ash: ASTM C618, Type F; maximum 15% replacement of Portland cement.
- D. Aggregates:
 - 1. Coarse: ASTM C33. Coarse aggregate shall consist of a clean, hard, fine grained, sound crushed rock, or washed gravel or a combination of both. It shall be free from oil, organic matter or other deleterious substances and shall not contain more than two percent by weight of shale or cherty material. "Cleanness value shall not be less than 75 when tested per MM Test Method, 227 and conforming to CBC Section 1903A.4.2.
 - 2. Fines: ASTM C33. Sand equivalent shall be not less than 75 when tested as per ASTM D2419.

3. Provide aggregates from a single source for exposed concrete.
- E. Water: Clean and potable, free from impurities detrimental to concrete.
- F. Water-Reducing Admixture: Must be compatible with color pigments where required. ASTM C494, Type A, that does not contain non-lignini sulfonate. Same as Grace Construction Materials' "WRDA" with hycol; Master Builders "Pozzolith" 322N; or equal product substituted per Section 012600, Modification Procedures.
- G. Other Admixtures: Only as accepted by the Architect and Structural Engineer.
- H. Non-Shrink Grout: Premixed high strength grout requiring only addition of water at the site. Same as Master Builder's "Masterflow 928 Grout"; Burke's "Non-Ferrous, Non-Shrink Grout", or equal product substituted per Section 012600, Modification Procedures.
- I. Curing Materials: Curing Compound: ASTM C309. Water loss – not more than 0.55 kg/m² in 72 hours; Light Reflectance – not less than 60%. Same as Grace Construction Materials' "Horn Clear Seal"; Grimes Co.'s "Sealcrete"; Master Builders' "Masterseal W", or equal product substituted per Section 012600, Modification Procedures.

2.4 CONCRETE MIXES

- A. Concrete mixes shall be accepted and shall be in accordance with CalTrans Standard Specifications Section 90. Unless otherwise noted, mix shall be Class "A," 3,000 psi, Type II Portland cement and 3/4-inch maximum aggregate.

2.5 ANCILLARY MATERIALS

- A. Concrete Sealer: As manufactured by L. M. Scofield Co. or silicone-based, non-staining product such as Siloxane as manufactured by Prosoco and available from White Cap (415) 626-3750 and as accepted by Project Inspector.
- B. Water Barrier: NT-100 as manufactured by Mirafi and as accepted by Project Inspector.

2.6 MIXES

- A. General Requirements:
 1. The Contractor shall perform tests or assemble the necessary data indicating conformance with specifications.
 2. For each mix submit data showing that proposed mix will attain the required strength in accordance with requirements of CBC Section 1905.

3. The Contractor shall instruct Laboratory to base mix design on use of materials tested and approved by the Testing Agency.
 4. Mix design shall include compression strength test reports per CBC Section 1905.6.
 5. Mix shall be designed, tested, and adjusted if necessary in ample time before first concrete is scheduled to be placed. Laboratory data and strength test results for revised mix design shall be submitted to Architect and Structural Engineer prior to using in project.
 6. Ensure mix designs will produce concrete to strengths specified and of uniform density without segregation.
 7. If mix yield exceeds 1-cubic yard, modify mix design to no more than one cubic yard without changing cement content.
 8. The Contractor's mix designs shall be subject to review by the Architect and Structural Engineer and by the Testing Agency.
 9. Introduction of calcium chloride will not be permitted.
 10. Unspecified admixtures will not be permitted unless the Architect and Structural Engineer reviews, the Contractor modifies mix designs as necessary, and modifications are accepted by the Testing Agency.
- B. Slab-on-Grade Mix requirements:
1. Maximum water/cement ratio: 0.50.
 2. Minimum fly ash content: 15 percent (as percentage replacement of cement).
 3. Do not use air entrainment additives.
 4. Use of Water-Reducing admixture is required. Use High Range Water-Reducing admixture (super plasticizer) when required to maintain workability and pumpability.
- C. Patching Mortar: Mix in proportions by volume of one part cement to two parts fine sand.
- D. Non-Shrink Grout: Follow approved manufacturer's printed instructions and recommendations.

2.7 MIXING

- A. Batching Plant Conditions:

1. Ensure equipment and plant will afford accurate weighing, minimize segregation and will efficiently handle all materials to satisfaction of the Architect, Structural Engineer and the Testing Agency.
2. Replace at no additional expense equipment the Architect, Structural Engineer and the Testing Agency deem inadequate or unsuitable.
3. Use approved moisture meter capable of determining moisture content of sand.

B. General Requirements:

1. Thoroughly clean concrete equipment before use for Architectural concrete mixes to avoid contamination.
2. Mix cement, fine and coarse aggregates, admixtures and water to exact proportions of mix designs. Method of mixing shall comply with CBC Section 1905.8.
3. Measure fine and coarse aggregates separately according to approved method which provides accurate control and easy checking.
4. Adjust grading to improve workability; do not add water unless otherwise directed.
5. Maintain proportions, values, or factors of approved mixes throughout work.
6. Mix concrete in transit mixers five minutes immediately prior to discharge in addition to mixing as called for by ACI 304 and ASTM C94.

- C. Admixtures: Use automatic metering dispenser to introduce admixture into mix. Dispenser shall be recommended and calibrated by admixture manufacturer.

2.8 SOURCE QUALITY CONTROL

A. The Testing Agency will:

1. Review mix designs, certificates of compliance, and samples of materials the Contractor proposes to use.
2. Test and inspect materials, as necessary, in accordance with ACI 318 and CBC Sections 1903, and 1905 for compliance with requirements.
3. Take samples as required from the Contractor's designated sources.
4. Take one grab sample for each 100 tons of Portland cement except that, when used in bulk loading ready-mix plants where separate bins for pre-tested cement are not available, take grab samples for each shipment of cement

placed in bin with not less than one sample being taken for each day's pour and subsequently test such samples if required by the Architect and Structural Engineer who may be so advised by the Division of the State Architect (DSA).

5. Test both coarse and fine aggregate by use of solution of sodium or magnesium sulfate, or both whenever in the judgment of the Architect and Structural Engineer such tests are necessary to determine quality of material. Perform such tests in accordance with ASTM C88. Loss shall not exceed 6-percent of either fine or coarse aggregate. Aggregate failing to comply with this requirement may be used in the Work provided it contains less than 2-percent of shale and other deleterious particles and shows a loss in soundness test of not more than 10-percent when tested in the sodium sulphate solution.
6. Test for sand equivalent of fine aggregate in accordance with California Test 217.
7. Test for cleanness value of coarse aggregate in accordance with California Test 227.
8. Inspect plant prior to any work to verify following:
 - a. Plant is equipped with approved metering devices for determining moisture content of fine aggregate.
 - b. Other plant quality controls are adequate.
9. Continuously inspect quality and quantity of materials used in transit mixed concrete, in batched aggregates and ready-mixed concrete at mixing plant or other location where other materials are measured.

B. Waiver of Batch Plant Inspection:

1. Continuous batch plant inspection may be waived if the plant complies with ASTM C94 and has been certified by an agency acceptable to DSA to comply with the requirements of the National Ready Mix Concrete Association.
2. When batch plant inspection is waived, the following requirements shall apply:
 - a. Testing Agency shall check the first batching at the start of work and furnish mix proportions to the licensed Weighmaster.
 - b. Licensed Weighmaster shall identify material quantities and certify each load by a ticket.
 - c. Project Inspector shall collect truck mix tickets with load identification and maintain a daily record of placement. Trucks

without a load ticket identifying the mix shall be rejected. Copies of daily placement record shall be submitted to DSA.

- d. At the end of the project, the Weighmaster shall submit an affidavit to DSA certifying that all concrete supplied conforms to proportions established by mix designs.

3.0 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Install all concrete work true to line and grade as indicated on the drawings. Installation shall conform with the standards and requirements of ACI 117-06- Specifications for Tolerance for concrete construction and materials.
- B. Correct irregularities to the satisfaction of the Architect and Structural Engineer.

3.2 PREPARATION

- A. Take every precaution to obtain a subgrade of uniform bearing power by compaction to provide a firm base.
- B. Subgrade shall be kept moist and shall not be allowed to dry out before placement of concrete. Place no material on muddy subgrade.
- C. Obtain acceptance of subgrade from Project Inspector prior to placing steel and concrete.

3.3 FORMS

- A. Forms shall be constructed in accordance with ACI 347 and shall be of sufficient strength and sufficiently tight to prevent visible distortion or leakage of mortar and fines.
- B. Forms for exposed surfaces shall be designed to protect intended finish. Deflection of facing material between studs shall not exceed 0.0025 of the span. Facing material and pattern of joints shall be as accepted by the Project Inspector.
- C. Maintain forms within the following tolerances.
 1. Top of Form: Plus or minus 1/8 inch in 10 feet and no abrupt variations; at required elevation to plus 3/8 inch.
 2. Face of Form: Plus or minus 1/4 inch in 10 feet longitudinal and no abrupt variations; perpendicular to surface plus or minus 1/8 inch.
- D. Obtain approval of formwork from Project Inspector prior to placing concrete.

- E. Forms may be reused upon cleaning and coating with parting compound to ensure separation from concrete without damage.
- F. After concrete is placed, the following minimum times shall elapse before removal of forms.
 - 1. Footing sides: 24 hours.
 - 2. Columns: 48 hours.

3.4 REINFORCEMENT

- A. All concrete shall be steel reinforced unless specifically noted to be "not reinforced." If no reinforcement is shown, reinforce in same manner as that shown in similar places.
- B. Fabricate and place reinforcement as indicated on the Drawings and in accordance with ACI "Detailing Manual" SP-66. No reinforcement shall be placed prior to distribution of the accepted shop drawings.
- C. Secure reinforcement in position by suitable supports and by wiring at intersections with tie wire. Supports shall be of sufficient number and strength to resist crushing or displacement under full load. Metal shall not extend to surface of concrete.
- D. At time of placing concrete, reinforcing shall be free of excessive rust, mill scale, or other bond reducing matter. Immediately before placing concrete, check and adjust position, support and anchorage.

3.5 PLACING CONCRETE

- A. The Inspector of Record, Architect, Structural Engineer, Testing Laboratory and DSA shall be notified at least 48 hours before placing concrete.
- B. Place concrete in accordance with CBC Section 1905.
- C. Place concrete in cycles as a continuous operation to permit proper and thorough integration and to complete scheduled placement. Place no concrete where sun, wind, heat, or facilities prevent proper finishing and curing.
- D. Convey concrete as rapidly and directly as practicable to preserve quality and to prevent separation from rehandling and flowing; do not deposit concrete initially set. Cast concrete within ninety (90) minutes after adding water unless otherwise noted. Retempering of concrete which has partially set will not be permitted.
- E. Take precautions to avoid damage to under-slab moisture barrier and displacement of reinforcement and formwork.

- F. Deposit concrete vertically in its final position. Avoid free falls in excess of six feet where reinforcement will cause segregation and in typical conditions unless the Architect and the Structural Engineer approves otherwise.
- G. Keep forms and reinforcement clean above pour line by removing clinging concrete with wire brush before casting next lift. Also remove leakage through forms.
- H. Interruption in casting longer than 60-minutes shall be cause for discontinuing casting for remainder of day. In this event, cut back concrete and provide construction joints as the Architect directs; clean forms and reinforcement as necessary to receive concrete at a later time.
- I. Hot Weather Concreting: Conform to ACI 305 and following requirements when mean daily temperature rises above 75 degrees Fahrenheit.
 - 1. An upper temperature limit of concrete mixes shall be established by the Contractor for each class of concrete. Concrete temperature during placing shall not be so high as to cause difficulty from loss of slump, flash set, or cold joints, and shall not exceed 90°F. Other project climatic conditions detrimental to concrete quality such as relative humidity, wind velocity, and solar radiation shall also be considered.
 - 2. Trial batches of concrete for each mix design shall be made at the limiting mix temperature selected. In lieu of trial batches, compression strength test reports (20 minimum) at the limiting temperature for each proposed mix shall be submitted to the testing laboratory for review.
 - 3. Practices to maintain concrete below maximum limiting temperature shall be in accordance with ACI 305. Concrete ingredients may be cooled before mixing, or flake ice or well-crushed ice of a size that will melt completely during mixing may be substituted for part of the mixing water.
 - 4. Practices to avoid the potential problems of hot weather concreting shall be employed by the Contractor in accordance with ACI 305.
 - 5. When the temperature of the reinforcing steel or steel deck forms is greater than 120°F, reinforcing and forms shall be sprayed with water just prior to placing the concrete.
- J. Cold Weather Concreting:
 - 1. No placement of concrete will be allowed at temperatures below 20 degrees Fahrenheit or if mean daily temperature for curing period is anticipated to be below 20 degrees Fahrenheit.
 - 2. No concrete placement will be allowed on frozen subgrade.

3. Conform to ACI 306 and following requirements when mean daily temperature falls below 40 degrees Fahrenheit.
 - a. Reinforcement, forms or ground to receive concrete shall be completely free from frost.
 - b. Concrete at time of placement for footings shall have temperature no lower than 50 degrees Fahrenheit, for all other concrete this minimum temperature at time of placement shall be 60 degrees Fahrenheit. Maximum temperature shall be 90 degrees Fahrenheit.
 - c. Concrete shall be maintained at temperature no lower than 50 degrees Fahrenheit for minimum 7-day period after placement by means of blanket insulation, heaters, or other methods as approved by the Architect and Structural Engineer.
 - d. Use of calcium chloride or admixtures containing calcium chloride as accelerators will not be permitted.
 - e. The Contractor shall keep a record of concrete surface temperature for first 7-days after each pour. This record shall be open to inspection by the Inspector.

K. Consolidating:

1. Use vibrators for thorough consolidation of concrete.
2. Provide vibrators for each location during simultaneous placing to ensure timely consolidation around reinforcement, embedded items and into corners of forms; ensure availability of spare vibrators in case of failures. Vibrate through full depth of freshly placed concrete.
3. Do not place vibrators against reinforcement, attach to forms, or use to spread concrete.
4. Exposed Concrete: Vibrate with rubber type heads and, in addition, spade along forms with flat strap or plate.

L. Construction Joints:

1. Verify location and conformance with typical details; provide only where designated or approved by the Architect and Structural Engineer. Comply with CBC Section 1906.4.
2. All horizontal and vertical construction joints to be thoroughly sandblasted to clean and roughen entire surface to minimum 1/4-inch relief exposing clean coarse aggregate solidly embedded in mortar matrix.

3. Just prior to depositing concrete, the surface of the construction joint shall be thoroughly wetted.

M. Walls and Other Formed Elements:

1. Space points of deposit to eliminate need for lateral flow. Placing procedures of concrete in forms permitting escape of mortar, or flow of concrete itself, will not be permitted.
2. Level top surface upon stopping work.
3. Take special care to fill each part of the forms by depositing concrete directly as near final position as possible, and to force concrete under and around reinforcement, embedded items, without displacement.
4. After concrete has taken its initial set, care shall be exercised to avoid jarring forms or placing any strain on ends of projecting reinforcement.
5. Where backfill is placed against a wall, it shall be adequately shored until it has attained design strength.

3.6 CURING

A. General Requirements:

1. Take curing measures immediately after casting and for measures other than application of curing compound, extend for seven days. The Architect and Structural Engineer may recommend longer periods based upon prevailing temperature, wind and relative humidity. Comply with CBC Section 1905.11.
2. Avoid alternate wetting and drying and fluctuations of concrete temperature.
3. Protect fresh concrete from direct rays of sun, rain, freezing, drying winds, soiling, and damage.
4. Do not permit curing method to affect adversely finishes or treatments applied to finish concrete.

B. Curing Method, Typical: Obtain the Architect's and Structural Engineer's approval of alternate measures.

1. Keep forms and concrete surfaces moist during period forms are required to remain in place.
2. Apply Creteseal (CS2000) per manufacturers' recommendations.

C. Cure exposed concrete in accordance with CalTrans Standard Specifications Section 90.

- D. Only water or curing compounds that impart no permanent color or gloss shall be used for curing concrete.

3.7 CONCRETE SEALING

- A. Seal all exposed surfaces according to manufacturer's specifications.

3.8 FIELD QUALITY CONTROL

- A. The Testing Laboratory will sample and test cast-in-place concrete as required by the Division of State Architects. Tests, if required, will be made in accordance with ACI 318 and CBC Section 1903.

1. Review concrete mix designs.
2. Inspect concrete and grout placement continuously.
3. Test concrete to control slumps according to ASTM C143.
4. Continuously monitor concrete temperature as it arrives on the site.
5. Test concrete for required compressive strength in accordance with CBC Section 1905:
 - a. Make and cure three specimen cylinders according to ASTM C31 for each 50 cubic yards, or fraction thereof, of each class poured at site each day.
 - b. Retain one cylinder for 7-day test and two for the 28-day test.
 - c. Number each cylinder 1A, 1B, 1C, 2A, 2B, 2C, etc; date each set; and keep accurate record of pour each set represents.
 - d. Transport specimen cylinders from job to laboratory after cylinders have cured for 24-hours on site. Cylinders shall be covered and kept at air temperatures between 60 and 80 degrees Fahrenheit.
 - e. Test specimen cylinders at age 7-days and age 28-days for specified strength according to ASTM C39.
 - f. Base strength value on average of two cylinders taken for 28-day test.
6. Test and inspect materials, as necessary, in accordance with ACI 318, MM Test Method 227 (Coarse Aggregates) and MM Test Method 217 (Fine Aggregates), for compliance with requirements specified in this Section.

- B. The Contractor shall:

1. Submit ticket for each batch of concrete delivered to job site. Ticket shall bear the following information:
 - a. Design mix number.
 - b. Signature or initials of ready mix representative.
 - c. Time of batching.
 - d. Weight of cement, aggregates, water and admixtures in each batch with maximum aggregate size.
 - e. Total volume of concrete in each batch.
 - f. Notation to indicate equipment was checked for contaminants prior to batching.
2. Pay the Testing Agency for taking core specimens of hardened structure and testing specimen according to ASTM C88 and C42 when laboratory tests of specimen cylinders show compressive strengths below specified minimum.

3.9 CLEANING, PATCHING AND DEFECTIVE WORK

- A. Where concrete is under strength, out of line, level or plumb, or shows objectionable cracks, honeycombing, rock pockets, voids, spalling, exposed reinforcement, signs of freezing or is otherwise defective, and, in the Architect's and Structural Engineer's judgment, these defects impair proper strength or appearance of the work, the Architect and Structural Engineer will require its removal and replacement at the Contractor's expense.
- B. Immediately after stripping and before concrete is thoroughly dry, patch minor defects, form-tie holes, honeycombed areas, etc., with patching mortar. Patch shall match finish of adjacent surface unless otherwise noted. Remove ledges and bulges.
- C. Compact mortar into place and neatly file defective surfaces to produce level, true planes. After initial set, dress surfaces of patches mechanically or manually to obtain same texture as surrounding surfaces.
- D. Rock Pockets:
 1. Cut out to full solid surface and form key.
 2. Thoroughly wet before casting mortar.
 3. Where the Architect and Structural Engineer deems rock pocket too large for satisfactory mortar patching as described, cut out defective section to solid

surface, key and pack solid with concrete to produce firm bond and match adjacent surface.

E. Cleaning

1. Insure removal of bituminous materials, form release agents, bond breakers, curing compounds if permitted and other materials employed in work of concreting which would otherwise prevent proper application of sealants, liquid waterproofing, and other delayed finishes and treatments.
2. Where cleaning is required, take care not to damage surrounding surfaces or leave residue from cleaning agents.

3.10 PROTECTION

- A. Protect concrete from injurious action of the elements and defacement of any nature during construction operations.
- B. Protect exposed corners of concrete from traffic or use which will damage them in any way.
- C. Make provisions to keep all exposed concrete free from laitance caused by spillage or leaking forms or other contaminants. Do not allow laitance to penetrate, stain, or harden on surfaces which have been textured.
- D. Remove and replace pavement that does not comply with requirements in this Section.
- E. Protect pavement from damage. Do not permit construction traffic on concrete pavement. Exclude other traffic from pavement for at least 28 days after placement.
- F. Maintain pavement free of stains, discoloration, dirt, and other foreign material. Sweep pavement not more than two days before date scheduled for Substantial Completion inspections.

3.11 DEFECTIVE CONCRETE

- A. If any concrete work is not formed as indicated, is under strength concrete, is concrete is out of line, level or plumb, or showing objectionable cracks, honeycomb, rock pockets, voids, spalling or exposed reinforcing, it shall be removed, repaired or replaced as directed by the Project Inspector.

3.12 CLEANING

- A. Refer to Section 017400, Construction Cleaning Waste Management for final cleaning procedures.

- B. During construction, wash off work as quickly as possible when stains or splotches are unavoidable.
- C. Upon completion, clean exposed surfaces carefully. Brushing and cleaning solution, if used, must be preceded and followed with a through rinsing of clear water. No sandblasting will be allowed to clean surfaces.
- D. Remove from premises; equipment, debris and surplus material needed for, or resulting from, this work. Remove all concrete waste from planting areas and legally dispose of it.
- E. All work shall be left in a condition satisfactory to the Project Inspector.
- F. Perform Work under this Section to keep affected portions of building site neat, clean, and orderly. Remove, immediately upon completion of Work under this Section, surplus materials, rubbish, and equipment associated with or used in performance. Be aware that failure to perform clean-up operations within 24 hours of notice by Architect and Structural Engineer will be considered adequate grounds for having work done by others at no added expense to the County

END OF SECTION

SECTION 033923 – MEMBRANE CONCRETE CURING

1.0 GENERAL

1.1 SECTION INCLUDES

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Surface preparation.
- D. Application of resin-based, water-based concrete curing compound.

1.2 RELATED SECTIONS

- A. Division 3 - See drawings
- B. Section 096500 – Resilient Flooring
- C. Section 096800 – Carpet Tile
- D. Section 099565 – Epoxy Coating

1.3 REFERENCES

- A. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- B. AASHTO M 148 - Liquid Membrane Forming Compounds for Curing Concrete.

1.4 SUBMITTALS

- A. Comply with Section 01330 - Submittal Procedures.
- B. Submit manufacturer's product data and application instructions.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store materials in a clean, dry area in accordance with manufacturer's instructions.
- C. Keep product from freezing.

- D. Avoid direct contact with this product as it may cause mild to moderate irritation of the eyes and/or skin.
- E. Protect materials during handling and application to prevent damage or contamination.
- F. Do not mix with any compound containing solvent.
- G. Avoid aggressive mixing as foaming may occur.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply product when air, surface, or material temperatures are expected to fall below 40° F (4° C) within four hours of expected application.
- B. Do not apply to frozen concrete.
- C. Do not use on dense or porous surfaces.

2.0 PRODUCTS

2.1 MANUFACTURER

- A. W. R. MEADOWS®, INC., PO Box 338, Hampshire, Illinois 60140-0338. (800) 342-5976. (847) 683-4500. Fax (847) 683-4544. Website: www.wrmeadows.com.

2.2 MATERIALS

- A. Performance Based Specification: Concrete curing compound shall be a water base, hydrocarbon resin curing compound meeting maximum volatile organic compound (VOC) content limits of 350 g/L for concrete curing compounds as required by the U.S. EPA Architectural Coatings Rule. Curing compound shall meet the following requirements:
 - 1. ASTM C309, Type 1, Class B.
 - 2. AASHTO M 148, Type 1, Class B.
- B. Proprietary Based Specification: 1100 Concrete Curing Compound by W. R. MEADOWS.

3.0 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive curing compound. Notify architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Protect adjacent surfaces not designated to receive curing compound.
- B. Clean and prepare surfaces to receive curing compound in accordance with manufacturer's instructions.
- C. Concrete surface water should be dissipated when used on new concrete
- D. Concrete surfaces should not be marred by walking workers.

3.3 APPLICATION

- A. Apply curing compound in accordance with manufacturer's instructions.
- B. Ensure product is mixed for optimum performance. Avoid aggressive mixing as foaming may occur.
- C. Use sprayer with a Chapin 1949 sprayer that produces a flow rate of 0.5 GPM (1.9 LPM) per minute at a pressure of 40 psi (.276 MPa).
- D. Avoid puddling in low areas.

3.4 PROTECTION

- A. Restrict foot traffic for at least four hours; 12 hours is preferable.

END OF SECTION

Division 5: Metals

SECTION 054000 – COLD-FORMED METAL FRAMING

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install metal-framing work as indicated on the project Drawings and specified herein, including, but not limited to:
 - 1. All light gauge cold formed steel headers, joists, columns, rafters, studs, plates, and fabricated connections.
 - 2. Erection of all metal framing and temporary bracing.
- C. Testing Laboratory for specified tests and inspections.
- D. Retesting or re- inspecting due to defective materials or workmanship will be back charged to the Contractor.

1.2 SUBMITTALS

- A. Comply with provisions of Section 013300, Submittal Procedures.
- B. Submit manufacturer's product data and installation instructions for each type of cold formed steel framing and accessory required.
- C. Submit shop drawings showing member, type, location, spacing, size and gauge of members, method of attachment to supporting members and all necessary erection details. Indicate supplemental bracing, strapping, splices, bridging, accessories and details required for proper installation.

1.3 QUALITY ASSURANCE

- A. All work shall conform to the 2016 California Building Code.
- B. Manufacturer shall have been regularly engaged at least five years in the manufacture of cold-formed metal framing products.
- C. Installer shall have been regularly engaged at least 3 years in the fabrication and erection of cold-formed metal framing.
- D. Welders shall be qualified in accordance with AWS D1.0.
- E. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Division 1 General Requirements of these Specifications.

1.4 PRODUCT DELIVERY, STORAGE, HANDLING

A. Storage Materials:

1. Framing members that are stored at the project site shall be above ground on platforms, skids or other supports.
2. Framing shall be protected from corrosion.
3. Other materials shall be stored in a weather tight and dry place, until ready for use in the work.
4. Packaged materials shall be stored in their original unbroken package or container.

2.0 PRODUCTS

2.1 MATERIALS:

A. All cold form metal framing shall be as follows.

1. Studs: ASTM A 653-653M steel G60 galvanized, channel shaped with lipped fringes, punched web, size thickness and grade as shown on Structural Drawings.
2. Tracks: ASTM A 653/653M steel, same designation, coating and thickness as studs except as otherwise noted, channel shaped, solid web, depth compatible with studs, size, thickness and grade as shown on Drawings.
3. Joists and Rafters: ASTM A 653/653M steel, G60 galvanized, channel shaped with lipped flanges, solid web, size as shown on Drawings, thickness and grade as shown on Drawings.

2.2 SOURCE QUALITY CONTROL

A. Testing Agency shall perform the following:

1. Review mill test certificates and verify that material to be supplied matches the mill certificates.
2. Determine mechanical properties of all structural steel lacking mill test certificates.
3. Qualification of shop welding procedures and personnel.
4. Initial inspection of shop welding startup and periodic inspection, as required to verify conformance to the contract documents, thereafter, provide full time inspection of all butt welds and any other welds indicated to be inspected on the drawings.

3.0 EXECUTION

3.1 FABRICATION

- A. Fabricate Structural Steel in accordance with the AISI Specifications and Code of Standard Practice.
- B. Shop Painting:
 - 1. Shop hot-dipped galvanized smooth all steel work except surfaces to be welded.
 - 2. All welded connections shall be cleaned and galvanized in the field after welding.

3.2 INSTALLATION

- A. Install cold-formed metal framing plumb, square, true to line and securely fastened as shown on Drawings.
- B. Follow manufacturer's installation instructions. If installation instructions conflict with these specifications or Drawings, adhere to specifications or Drawings.
- C. Cut members by shearing or sawing.
- D. Install members in single-piece lengths except that tracks may be spliced, butt-welded, or each length anchored to a common building frame element.
- E. Repairs and Touch-up: Clean damaged surfaces and coatings. Touch up field welds and damaged galvanized surfaces with galvanizing repair compound.
- F. Tolerances:
 - 1. Variation from plumb, level, and true to line: 1/8 inch in 10 feet (1:960).
 - 2. Member Spacing: Not more than 1/8 inch plus or minus from spacing indicated.

END OF SECTION

SECTION 055000 – METAL FABRICATIONS

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
 - 1. Countertop supports.
 - 2. Galvanized and painted steel pipe, rain water leaders, bike racks, and parking sign poles
 - 3. Ladder to roof and between roof levels.
 - 4. Miscellaneous channels, angles and other shapes as required.
 - 5. Rough Hardware.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 031000 - Concrete Formwork: Placement of metal fabrications to be embedded in concrete.
- C. Section 099100 - Painting: For finish painting of items not specified to have factory finish.
- D. Section 133419 – Metal Building System: For coordination of miscellaneous anchoring and attachment fabrications.

1.3 REFERENCES

- A. AISC - American Institute of Steel Construction
- B. ANSI - American National Standards Institute

1. A14.3 - Safety Requirements for Fixed Ladders.
 2. B18.6.3 - Machine Screws and Machine Screw Nuts (M4)
 3. B18.21.1 - Lock Washers (Inch Series)
 4. B18.22.1 - Plain Washers.
- C. ASTM - American Society for Testing and Materials
1. A27 - Standard Specification for Steel Castings, Carbon, for General Application.
 2. A36 - Standard Specification for Structural Steel.
 3. A47 - Standard Specification for Ferritic Malleable Iron Castings.
 4. A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 5. A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 6. A276 - Standard Specification for Stainless Steel and Heat-Resisting Steel Bars and Shapes.
 7. A307 - Standard Specification for Carbon Steel Bolts and Studs, 60,000 Psi Tensile Strength.
 8. A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
 9. A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
 10. A563 - Standard Specification for Carbon and Alloy Steel Nuts.
 11. A780 - Practice for Repair of Damaged Hot-Dip Galvanized Coatings.
 12. B221 - Standard Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
 13. B633 - Standard Specification for Electro-Deposited Coatings of Zinc on Iron and Steel.

14. C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink).
 15. E488 - Test Method for Strength of Anchors in Concrete and Masonry Elements
 16. F593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws and Studs.
 17. F594 - Standard Specification for Stainless Steel Nuts.
- D. AWS - American Welding Society
1. D1.1 - Structural Welding Code - Steel.
 2. D1.3 - Structural Welding Code - Sheet Steel.
- E. CBC - California Building Code, 2016 Edition
- F. FS - Federal Specification
1. FF-B-588 - Bolt, Toggle and Expansion Sleeve, Screw.
- G. NAAMM - National Association of Architectural Metal Manufacturers
1. MFM - Metal Finishes Manual for Architectural and Metal Products.
- H. SSPC - The Society for Protective Coatings
1. PA-1 - Paint Application Specification No. 1.
 2. SP-2 - Surface Preparation Specification No. 2: Hand Tool Cleaning.
 3. SP-3 - Surface Preparation Specification No. 3: Power Tool Cleaning.
 4. SP-6 - Surface Preparation Specification No. 6: Commercial Blast Cleaning.

1.4 SYSTEM DESCRIPTION

- A. Design Requirements
1. Design work to support normally imposed loads and in conformity with AISC requirements.
 2. Structural Performance of Handrails and Railing Systems: Engineer,

fabricate and install handrails and railing systems to withstand structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections. Apply each load to produce the maximum stress in each of the respective components of each metal fabrication in accordance with CBC Table 16-B.

3. Provide for expansion and contraction.
4. Ladder to Roof Access Hatch and Ladders Above Roof: Engineer, fabricate and install ladders in accordance with requirements of NAAMM, except that for vertical ladders, the distance from ladder rung to wall shall not be less than 7 inches.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for paint products and grout.
- B. Shop Drawings: Submit shop drawings detailing fabrication and erection of each metal fabrication indicated. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts specified for installation under other Sections.
- C. Samples: Submit samples representative of materials and finished products as may be requested by the Architect.
- D. Quality Control Submittals
 1. Certificates: Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" Article.

1.6 QUALITY ASSURANCE

- A. Qualifications
 1. Fabricator Firm experienced in producing metal fabrications similar to those indicated for this Project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the Work.
- B. Welding Standards: Comply with applicable provisions of AWS D1.1 and AWS D1.3.
 1. Certify that each welder has satisfactorily passed AWS qualification

tests for welding processes involved and, if pertinent, has undergone recertification.

1.7 PROJECT CONDITIONS

A. Field Measurements

1. Check actual locations of walls and other construction to which metal fabrications must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings.
2. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
 - a. Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions. Allow for trimming and fitting.

2.0 PRODUCTS

2.1 MATERIALS

- A. Metal Surfaces, General: For metal fabrications exposed to view in the completed Work, provide materials selected for their surface flatness, smoothness, and freedom from surface blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names or roughness.
- B. Steel and Iron
 1. Steel Plates, Shapes and Bars: ASTM A36.
 2. Stainless Steel Shapes: ASTM A276.
 3. Cold-Formed Steel Tubing: ASTM A500.
 4. Hot-Formed Steel Tubing: ASTM A501.
 - a. Where indicated, provide tubing with hot-dip galvanized coating per ASTM A53.
 5. Concrete Inserts: Anchors of type indicated below, fabricated from corrosion resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per

ASTM E488, conducted by a qualified independent testing agency.

- a. Threaded or wedge type; galvanized ferrous castings, either ASTM A47 malleable iron or ASTM A27 cast steel. Provide bolts, washers, and shims as required, hot-dip galvanized in accordance with ASTM A153.
- C. Aluminum Extrusions; ASTM B221, alloy 6063-T6.
- D. Fasteners: Provide plated fasteners complying with ASTM B633, Class Fe/Zn 25 for electrodeposited zinc coating, for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.
1. Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A, with hex nuts, ASTM A563, and, where indicated, flat washers.
 2. Machine Screws: ANSI B18.6.3.
 3. Plain Washers: Round, carbon steel, ANSI B18.22.1.
 4. Lock Washers: Helical, spring type, carbon steel, ANSI B18.21.1.
 5. Expansion Anchors; Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E488 conducted by a qualified independent testing agency.
 - a. Material: Carbon steel components zinc-plated to comply with ASTM B633, Class Fe/Zn 5.
 - b. Material: Group 1 alloy 304 or 316 stainless steel bolts and nuts complying with ASTM F593 and ASTM F594.
 6. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as required.
- E. Welding Materials: AWS D1.1, type required for materials being welded.
- F. Coatings
1. Coatings for Protection of Dissimilar Materials
 - a. Dissimilar Metals: Bituminous type materials conforming with MIL Standard 889.
 - b. Aluminum in Contact with Concrete, Metal, Wood or other

Absorptive Material.

2. Shop Primer for Ferrous Metal: VOC compliant, fast-curing, lead and chromate free, universal modified alkyd primer with good resistance to corrosion, compatible with finish paint systems.
3. Galvanizing Repair Paint: High zinc dust content paint, with dry film containing not less than 94 percent zinc dust by weight, as manufactured by Parker Amchem, "Galvaprep SG"; Sherwin Williams, "Zinc Clad I"; Alvin Products, Inc., "Galvax"; ZRC Chemical Products Co., "ZRC Cold Galvanizing Compound", or equal.

G. Nonshrink, Nonmetallic Grout

1. Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
2. Manufacturer. Five Star Products, "Five Star Grout"; Master Builders Technologies, Inc., "Masterflow 928 and 713"; W. R. Meadows, Inc., "Sealtight 588 Grout", or equal.

H. Handrail and Railing Brackets: As indicated on the Drawings.

I. Galvanized Welded Wire Mesh Panels: 2 inches, center to center, 0.128-inch diameter galvanized wire.

2.2 FABRICATION, GENERAL

- A. Form metal fabrications from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.
- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
- C. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed metal assemblies to prevent buckling, opening up of joints, and overstressing of welds and fasteners. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.
 1. Temperature Change (Range): 100 degrees Fahrenheit.

- D. Shear and punch metals cleanly and accurately. Remove burrs.
- E. Ease exposed edges to a radius of approximately 1/32-inch, unless otherwise indicated. Form bent-metal comers to smallest radius possible without causing grain separation or otherwise impairing work.
- F. Remove sharp or rough areas on exposed traffic surfaces.
- G. Weld comers and seams continuously to comply 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. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.
- H. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts. Locate joints where least conspicuous.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- K. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- L. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes where water may accumulate.
- M. Ladders
 - 1. General: Fabricate steel and aluminum ladders for the locations shown, with dimensions, spacings, details, and anchorages as indicated. Comply

with requirements in accordance with NAAMM and ANSI A14.3.

2. Side Rails*. Continuous, steel, 5/8-inch by 2-1/2 inch flat bars, with eased edges, spaced 18 inches apart and aluminum rails.
3. Bar Rungs: 3/4-inch diameter solid steel or aluminum bars, spaced 12 inches on center.
4. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.
5. Support ladder at top and bottom and at intermediate points spaced not more than 60 inches on center with welded or bolted steel or aluminum brackets.
 - a. Size brackets to support design dead and live loads indicated and to hold centerline of ladder rungs clear of the wall surface by not less than 7 inches for roof ladder.
 - b. Extend side rails 42 inches above top rung, and return rails to wall or structure unless other secure handholds are provided. If the adjacent structure does not extend above the top rung, goose-neck the extended rails back to the structure to provide secure ladder access.
6. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to the rung by a proprietary process, as manufactured by 1KG Borden, "Mebac"; W. S. Molnar Co., "Slip-Not", or equal.
7. Galvanize steel ladder, including brackets and fasteners.

2.3 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports for applications indicated that are not a part of structural steel framework as required to complete the Work.
- B. Fabricate units to sizes, shapes, and profiles indicated and required to receive other adjacent construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive hardware, hangers, and similar items.
 1. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.

- a. Except as otherwise indicated, space anchors 24 inches on center and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4-inch thick by 8 inches long.

C. Galvanize miscellaneous interior and exterior framing and supports.

2.4 FINISHES, GENERAL

- A. Comply with NAAMM MFM for recommendations relative to applying and designing finishes. Finish metal fabrications after assembly.

2.5 STEEL AND IRON FINISHES

- A. Galvanizing: For those items indicated for galvanizing, apply zinc coating by the hot-dip process complying with the following requirements:

1. ASTM A153 for galvanizing iron and steel hardware.
2. ASTM A123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed, and forged shapes, plates, bars, and strip 0.0299-inch thick or thicker.

- B. Preparation for Shop Priming: Prepare uncoated ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Typical: SSPC SP-2, SSPC SP-3 as required.
2. Architectural Exposed Steel Fabrications: SSPC SP-6.

- C. Apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes or to be embedded in concrete or masonry, unless otherwise indicated. Comply with requirements of SSPC PA-1 for shop painting.

- D. Finish Painting: As specified in Section 099000, for steel where indicated.

2.6 ALUMINUM FINISHES

- A. Aluminum

1. Mill finish or anodized finish, where indicated on the Drawings.

2. Powder Coat Finish: Manufacturer's standard with color as selected by the Architect, where indicated on the Drawings.

3.0 EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages, including concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.
- B. Set sleeves in concrete with tops flush with finish surface elevations. Protect sleeves from water and concrete entry.

3.2 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction. Include threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws, and other connectors as required.
- B. Cutting, Fitting and Placement: Perform cutting, drilling, and Fitting required for installing miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment and elevation; with edges and surfaces level, plumb, true and free of rack; and measured from established lines and levels.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete masonry or similar construction.
- D. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
- E. Field Welding: Comply with the following requirements:
 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. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing, and contour of welded surface matches those adjacent.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.
- 3.3 ADJUSTING AND CLEAN UP
- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC PA-1 requirements for touching up shop-painted surfaces.
1. Apply by brush or spray to provide a 2.0-mil minimum dry film thickness.
- B. For galvanized surfaces, clean welds, bolted connections and abraded areas, and apply galvanizing repair paint to comply with ASTM A780.

END OF SECTION

SECTION 055200 – METAL RAILINGS

1.0 GENERAL

1.1 SECTION INCLUDES

- A. Metal Handrails
- B. Steel Pipe
- C. Steel Plate

1.2 RELATED SECTIONS

- A. Division 3 – Concrete

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM A36 Specification for Structural Steel
 - 2. ASTM A53 Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless
 - 3. ASTM A123 Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - 4. ASTM A143 Recommended Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
 - 5. ASTM A153 Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - 6. ASTM A307 Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile
 - 7. ASTM A384 Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies
 - 8. ASTM A385 Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
 - 9. ASTM A449 Specification for Quenched and Tempered Steel Bolts and Studs

10. ASTM A563 Specification for Carbon and Alloy Steel Nuts
 11. ASTM A780 Practice for Repair of Damaged Hot-Dip Galvanized Coatings
 12. ASTM D2092 Practices for Preparation of Zinc-Coated Galvanized Steel Surfaces for Paint
- B. National Association of Architectural Metal Manufacturers (NAAMM):
1. "Pipe Railing Manual, Including Round Tube"
- C. Steel Structures Painting Council (SSPC):
1. SSPC-SP 1 Solvent Cleaning
 2. SSPC-SP 3 Power Tool Cleaning
 3. SSPC-SP 10 Near-White Blast Cleaning
 4. SSPC-SP 11 Power Tool Cleaning to Bare Metal

1.4 SUBMITTALS

- A. General: Refer to Section 013300 - Submittal Procedures for submittal requirements and procedures.
- B. Shop Drawings: Submit detailed Shop Drawings of metal handrails and railings, showing sizes, details of fabrication and construction, bends and radii, handrail brackets, locations of hardware, anchors, and accessories, and installation details.
- C. Product Data: Submit manufacturers' product data of railing system and railing components, handrails, and handrail brackets. Include corrosion-inhibitive shop coat painting system.

2.0 PRODUCTS

2.1 MATERIALS

- A. Metal Handrails: Standard Steel Pipe, Architectural Handrail Grade, of diameter and sizes indicated. Exterior metal handrails shall be galvanized. Provide terminal safety returns for all stair handrails. Handrail brackets shall be galvanized malleable iron, manufactured for the purpose, for anchorage to concrete walls. Include all fittings and components, sleeves, hardware, backing plates, and accessories as required for complete and finished handrail installations.

- B. Steel Pipe: Pipe for railings, pipe supports, and pipe sleeves shall be seamless steel pipe, conforming to ASTM A53, Type S, Grade A, of diameters and sizes indicated. Special instructions shall be given the pipe manufacturer to provide Architectural Handrail Grade pipe.
- C. Plate: Steel plate for anchor plates shall be standard steel plate, conforming to ASTM A36, weldable quality.
- D. Welding Rod/Electrodes: Refer to Section 051200 – Structural Steel, for requirements.
- E. Anchors, Fasteners, and Accessories: Provide all required anchors, fasteners, miscellaneous components, and accessories as required for complete and finished railing installations. Bolts and studs, nuts, and washers shall conform with ASTM A307, A449, and A563, as applicable, and shall be galvanized in accordance with ASTM A153.
 - 1. Expansion Bolts: Where anchors are not included in the concrete construction, provide galvanized expansion type anchors with matching galvanized steel bolts or studs with nuts, of sizes as indicated or required. Provide washers under all bolt heads and nuts. Expansion bolts require approval of the Engineer before they may be installed in posttensioned slabs. Expansion bolts will not be permitted for use on concrete curbs or along the edge of concrete or a concrete joint.
- F. Grout: Refer to Section 051200 – Structural Steel, for requirements.

2.2 FABRICATION

- A. Metal handrails and railings shall be fabricated by firms or shops experienced and skilled in the custom fabrication of architectural metal handrails and railings, and shall meet the quality requirements of NAAMM's Pipe Railing Manual.
- B. Bends in rails shall be precision-formed to a smooth continuous radius by skilled workers. Work quality and finish shall be true to detail. Butt joints shall have internal pipe sleeve or dowel. Ends shall be closed with similar materials, welded and ground smooth.
- C. Steel welded connections shall be made in accordance with applicable requirements of Section 051200 – Structural Steel. Welding shall be performed in the shop unless otherwise indicated. Welded joints of handrails and railings shall be ground and dressed smooth to match adjacent surfaces and so that the shape and profile of the item welded is maintained.
- D. Metal handrails and railings shall be prefabricated and preassembled in the

factory or shop as far as practicable.

2.3 GALVANIZING

- A. Ferrous metal railings and related items on the exterior of the building, or as otherwise indicated, shall be galvanized, after fabrication, by the hot-dip process in accordance with ASTM A123 and ASTM A385. Weight of zinc coating shall conform with requirements specified under "Weight of Coating" in ASTM A123.
- B. Safeguarding against steel embrittlement shall conform to applicable requirements of ASTM A143.
- C. Safeguarding against warpage and distortion of steel members shall conform to applicable requirements of ASTM A384.
- D. Shop galvanized metalwork necessitating field welding which in any manner removes original galvanizing shall be restored by galvanizing repair in accordance with ASTM A780.
- E. Bolts and screws for attachment of galvanized items shall be galvanized in accordance with ASTM A153, or of compatible, non-corrodible material.

2.4 CLEANING

- A. Cleaning shall conform to like requirements specified in Section 051200 –
Structural Steel.
- B. All surfaces of metal handrails and railings shall be cleaned and treated to assure maximum paint adherence, prior to application of the shop prime coat, in accordance with SSPC-SP 1, SSPC-SP 3, SSPC-SP 10, SSPC-SP 11 as applicable for the type of substrate, exposure, and application.
- C. Ferrous metalwork shall be given a shop coat of rust-inhibitive metal primer as specified in Section 051200 – Structural Steel, or other approved rust-inhibitive metal primer standard with the railing manufacturer.

3.0 EXECUTION

3.1 INSTALLATION

- A. Install metal handrails and railings as indicated and in accordance with the approved Shop Drawings, using workers skilled and experienced in the installation of the type of work involved. Conform with the installation requirements of NAAMM's Pipe Railing Manual, as applicable.
- B. Install metal handrails and railings with accessories furnished by the railing

fabricator as required for complete and finished railing installations.

- C. Installation of handrails and railings shall be in accordance with approved Shop Drawings, true and horizontal, perpendicular, or at the required angle, as the case may be, level and square, with angles and edges parallel with related lines of the building or structure.
- D. Field welding, where required, shall conform with requirements of Section 051200 – Structural Steel.
- E. Where railing base plates require grouting, conform with requirements of Section 051200 – Structural Steel, as applicable.

3.2 GALVANIZING REPAIR

- A. Galvanized surfaces which have become damaged from welding, handling, or installation shall be repaired immediately after installation with galvanizing repair material in accordance with ASTM A780.

END OF SECTION

**Division 6:
Wood, Plastics &
Composites**

SECTION 061000 - ROUGH CARPENTRY

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. The work included under this section consists of furnishing all material, supplies, equipment, tools, transportation and facilities and performing all labor and services necessary for, required in connection with or properly incidental to furnishing and installing rough carpentry, as described in this section of the specifications, shown on the accompanying drawings, or reasonably implied therefrom.
- D. Work Included:
 - 1. Furnishing and installing wood framing and sheathing
 - 2. Furnishing and installing bolts, lag screws, washers, spikes and nails necessary for connecting wood framing and sheathing
 - 3. Installing miscellaneous metal connectors
 - 4. Temporary bracing

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 031000 - Concrete Formwork
- C. Section 133419 – Metal Building System

1.3 QUALITY ASSURANCE

- A. Lumber Grading Agency: Certified by ALSC.

- B. Plywood Grading Agency: Certified by APA.
- C. California Code of Regulations (also known as California Building Code (CBC)) Title 24, 2016 Edition, DSA/SS/AC provisions.
- D. Grade marks:
 - 1. All framing lumber shall be identified by the grade stamp of the West Coast Lumber Inspection Bureau.
 - 2. All plywood shall be identified as to species, grade, and glue type, and shall bear the identification grade mark of the American Plywood Association.
- E. Testing and Inspection:
 - 1. The Owner shall employ an independent testing laboratory or the Engineer as the Owner's agent to perform the inspections and tests shown on the contract drawings and DSA Form 103 Statement of Structural Tests & Special Inspections and submit certified test results. The Contractor will cooperate with and notify Owner's agent at least 24 hours in advance of inspections required.

1.4 SUBMITTALS

- A. General Requirements
 - 1. Submittals shall be made to Architect in accordance with the requirements of Division 1 General Requirements of these specifications.
 - 2. Construction of wood framing and sheathing shall not begin until Contractor has received submittals reviewed by Architect governing all aspects of the intended work.
- B. Product Data: Manufacturer's catalog sheets including instructions for use and description of application shall be provided on each of the following materials:
 - 1. Light gage metal connectors

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Provide proper facilities for handling and storage of materials to prevent damage to edges, ends, and surfaces.
- B. Deliver and store packaged products in original containers and bundles with seals unbroken and labels intact until time of use.
- C. Keep materials dry. Where necessary, stack materials off ground on level flat forms, fully protected from weather.

1.6 SEQUENCING AND SCHEDULING

- A. Obtain information and instructions from other trades and suppliers in ample time to schedule and coordinate the installation of items furnished by them to be installed prior to or in conjunction with rough carpentry so provision for their work can be made without delaying the project.
- B. Do any cutting and repairing made necessary by failure or delay in complying with these requirements, at no cost to Owner.

2.0 PRODUCTS

2.1 FRAMING

- A. General: Framing shall be Douglas Fir Coast Region, conforming to West Coast Lumber Inspection Bureau Standard Grading and Dressing Rule No. 17, as amended to date.
 - 1. 2x, 3x, 4x, plates, joists, purlins and beams, No. 1 and better (1200F-b), Para. 123-b, unless noted otherwise on the drawings.
 - 2. 2x, 3x, 4x, joists, purlins and beams, Select Structural (1500F-b), 123-a, where noted on the drawings.
 - 3. 6x beams, Dense No. 1 (1550F-b). Para 130-bb.
 - 4. 2x, 3x, 4x ledgers, No. 1 (1000F-b), Para. 123-b, unless noted otherwise on the drawings.
 - 5. 4x4 posts, No. 1 (1500F-c), Para. 124-b, unless noted otherwise on the drawings.
 - 6. 4x6 posts, No. 1 (1500F-c), Para. 123-b, unless noted otherwise on the drawings.

7. 6x6 and larger posts, Dense No. 1, (1200F-c), Para. 131-bb.
8. 2x, 3x studs and blocking, No. 1 (1000F-b), Para. 123-b.
9. Foundation plates: Pressure treated Douglas Fir No. 1.

B. All framing lumber 6" or larger in the least dimension shall be F.O.H.C.

2.2 PLYWOOD

A. General: Plywood shall conform to U.S. Product Standard PS 1-07, American Plywood Association. Each sheet shall be stamped with the PS and/or APA grademark.

B. Roof Plywood

1. Shall be 5 ply exposure 1, CDX, span rating 32/16, Species Group 2 or better.
2. Shall be 5 ply exposure 1, Structural I span rating 32/16, Species Group 1.

C. Wall Plywood

1. Shall be exterior type, T1-11 A-C span rating 16 o.c. Species Group 1 with grooves at 8" o.c.
2. Shall be 3 ply exposure 1, CDX, span rating 24/0, Species Group 2 or better.
3. Shall be 4 ply exposure 1, Structural I, span rating 32/16, Species Group 1.

D. Specialty Plywood at Pass Through Window and as indicated on plans

1. Shall be marine grade type, 3/4" thick, 7 ply, A-B marine meeting PS1-09 standards.

2.3 ENGINEERED WOOD MEMBERS

A. Laminated-Veneer Lumber: A composite of wood veneers with grain primarily parallel to member lengths, manufactured with an exterior-type adhesive complying with ASTM D 2559. Product has the following allowable design values as determined according to ASTM D 5456:

1. Extreme Fiber Stress in Bending, Edgewise: 2600 psi for 12-inch nominal

depth members.

2. Modulus of Elasticity, Edgewise: 1,900,000 psi.

B. Parallel-Strand Lumber: A composite of wood strand elements with grain primarily parallel to member lengths, manufactured with an exterior-type adhesive complying with ASTM D 2559. Product has the following allowable design values as determined according to ASTM D 5456:

1. Extreme Fiber Stress in Bending, Edgewise: 2900 psi for 12-inch nominal- depth members.

2. Modulus of Elasticity, Edgewise: 2,000,000 psi.

2.4 LIGHT GAGE METAL CONNECTIONS

A. Light gage metal connectors shall be Simpson Company Strong Tie Connectors, or equal unless noted otherwise on the drawings.

2.5 NAILS

A. Nails shall be bright common wire nails, galvanized for exterior work and conform to Federal Specifications FF-N-105B.

B. Nailing shall conform to CBC Table 2304.10.1, unless otherwise noted.

C. Nails in pressure treated lumber shall be hot dipped galvanized steel in compliance with ASTM A153.

2.6 BOLTS

A. Bolts shall conform to ASTM A 307, manufactured to American Standard Bolt and Nut dimensions with "Free Fit-Class 2" threads.

B. Bolts in pressure treated lumber shall be hot dipped galvanized steel in compliance with ASTM A153

2.7 PRESERVATIVE TREATMENT FOR WOOD

A. Preservative Treatment for Wood: Water-borne, non-arsenic, non-chromium type complying with AWPA Standard U1. Preservative treatment shall not contain pentachlorophenol, arsenic compounds, or creosote. In addition, the preservative treatment shall comply with the following:

1. Material: Paintable

2. Comply with CARB limit on VOCs of 350 g/L using EPA Test Method 24.
3. Moisture Content: After treatment, re-dry wood to be used in enclosed locations to a moisture content of 19% or less.
4. Retreat all field cut ends and surfaces.

3.0 EXECUTION

3.1 GENERAL REQUIREMENTS

- A. All framing operations shall conform to the requirements of the California Building Code.
- B. Set horizontal and sloped members with crown up. Do not notch, bore or cut members for pipes, ducts, conduits, or other reasons except as shown on the drawings or as specifically approved by the Architect/Engineer. Make all bearings full and all blocking solid unless otherwise indicated on the drawings. Finish all bearing surfaces on which structural members are to rest so as to give sure and even support. Where framing members slope, cut or notch the ends as required to give uniform bearing surface.
- C. Joists shall be set with the crowning edge up except at cantilevers.
- D. Solid blocking shall be placed at ends of spans and over supports. Cross-Bridging or solid blocking in spans shall not exceed 8 feet or less if shown on structural drawings.
- E. Furnish and set all columns and studs to size, centers, and locations indicated on the drawings. Unless marked otherwise, studs for furring and partitions shall be 2x4 or 2x6, set 16" o.c. plates on concrete floors shall not be set until the concrete is finished. Cripples shall be run to the floorplates.
- F. Remove all wood, including form lumber, scrap lumber, shavings and sawdust in contact with ground. Leave no wood buried in any fill or backfill.
- G. Furring and blocking shall be furnished and installed where required for reception of wallboard, formation or architectural features, concealment of pipes, conduits, ducts, attachment of supports for towel holders, toilet paper holders, and other fixtures. Contractor shall consult with the trades concerned and set furring and blocking they require.

- H. Fire Blocking shall be installed as shown on drawings and in accordance with the applicable Building Code.
- I. Framing of openings through walls, floors, attics, and roofs shall be provided for roof vents, mechanical equipment, lighting fixtures, ducts, etc. Where one or more joists are cut, the joists supporting the trimmers shall be framed in accordance with the drawings or if not detailed shall be doubled and well spiked. Where continuation of three or more joists is interrupted, the abutting headers and joists shall be reinforced with approved type of joists hangers.
- J. Center joints or plywood accurately over supports and nail into solid wood. Protect all plywood from moisture by use of all required waterproof covering until the plywood has in turn been covered by the next succeeding component or finish.
- K. Lumber not grade stamped, and lumber of improper grade, shall be removed from the job site and immediately replaced by grade stamped lumber of the proper grade.
- L. Other Materials: All other lumber materials, not specifically described but required for the proper completion of the work, shall be new, first quality of their respective kinds and subject to the approval of the Architect/Engineer.
- M. Where the plans do not require solid blocking or a tongue and groove connection at edges of plywood or OSB sheathing, the sheathing edges shall be supported with ply clips or ply cleats.

3.2 EXAMINATION

- A. Surface Conditions: Prior to the work of this section carefully inspect the installed work of other trades and verify that all such work has been so installed as to allow rough carpentry to produce surfaces to the required design.

3.3 WORKMANSHIP

- A. All rough carpentry shall produce joints true, tight, and well nailed with all members assembled in accordance with the drawings and with all pertinent regulations.
- B. Cut all wood members to fit. Do not shim.
- C. Erect all members straight, plumb and accurately located.
- D. Carefully select all structural members. Select individual pieces so that knots and obvious defects will not interfere with making proper connections. Lumber

may be rejected by the Architect, whether or not it has been installed, for excessive warp, twist, bow, or crook, or for mildew, fungus or mold as well as for improper cutting or fitting. Cut out and discard all defects which render a piece unable to serve its intended function.

3.4 INSTALLATION

- A. Plates: Plates for partitions and walls shall be single at bottom and double at top. Splices in top plates shall be staggered not less than 48". Where plates are cut for passing pipes and similar items, they shall be reinforced on both sides with 1/8"x3"x18" steel plates punched for 10d nails 6" on center, staggered.
- B. Power Driven Inserts: Wherever furring of any kind is attached to concrete or masonry, including lower plates to floors, the members shall be secured with 1/4" power driven inserts. Plates anchored to concrete floors shall be attached with pins not over 3 feet on center. All studs on vertical furring shall be attached with pins not over 4 feet on center. Each insert shall penetrate the concrete to a minimum of 1- 1/2". Use washers with all inserts.

3.5 ERECTION

- A. The Contractor will be responsible to erect the wood framing true to line and grade.
- B. Temporary Bracing and Shoring:
 - 1. The Contractor shall temporarily brace the wood framing in both directions and shall maintain walls, joists, beams, and other framing members plumb until the final connections of the framework and construction of diaphragms are complete.
 - 2. The Contractor shall provide such temporary shoring and additional bracing of wood framing as required to adequately and safely support any or all loads imposed upon the structure during construction.

3.6 CLEAN UP

- A. In addition to the requirements of General Conditions, keep premises clean and clear of debris caused from this portion of the work. Failure to perform clean up within 24 hours notice by the Architect or General Contractor shall be considered adequate grounds for having the work done by others at this subcontractor's expense.

3.7 FIELD QUALITY CONTROL

- A. Inspections: The District's agent will perform the inspections as shown on the contract drawings.

END OF SECTION

SECTION 061643 – GLASS-MAT GYPSUM SHEATHING

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Section Includes:
 - 1. Exterior glass-mat gypsum wall and soffit sheathing.
 - a. Wall Assembly Fire-Resistance Rating: 1-Hour.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 054000 - Cold-Formed Metal Framing: Provision of metal framing.
- C. Section 055000 - Metal Fabrications: Provision of metal framing.
- D. Section 072116 - Blanket Insulation
- E. Section 079000 - Sealants and Caulking: Provision of caulk.

1.3 REFERENCES

- A. ASTM – International American Society for Testing and Materials
 - 1. ASTM B 117: Standard Practice for Operating Salt Spray (Fog) Apparatus.
 - 2. ASTM C 954: Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 inch to 0.112 inch in Thickness
 - 3. ASTM C1177: Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - 4. ASTM E 119: Test Methods for Fire Tests of Building Construction and Materials.

B. GA - Gypsum Association

1. GA-253: Application of Gypsum Sheathing.
2. GA-600: Fire Resistance Design Manual.

1.4 SUBMITTALS

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

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat and spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under covering.
1. Handle gypsum boards to prevent damage to edges, ends and surfaces.

1.6 PROJECT CONDITIONS

A. Environmental Conditions

1. Establish and maintain environmental conditions for application and finish gypsum board to comply with ASTM C840 and with gypsum board manufacturer's recommendations. Maintain not less than 40 degrees Fahrenheit minimum room temperature.
2. Ventilate building spaces to remove water not required for drying joint treatment materials. Avoid drafts during day, hot weather to prevent materials from drying too rapidly.

1.7 WARRANTY

- A. Manufacturer standard warranty against delamination against delamination of facing and degradation of sheet for a period of 12 months from installation of board.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: United States Gypsum Co.; Gold Bond Building Products Div., National Gypsum Co.; Pacific Coast Building Products, Pabco Gypsum Division, or equal.

- B. Basis of Design: National Gypsum Company; Gold Bond® BRAND eXP® Fire-Shield Extended Exposure Gypsum Sheathing.

2.2 MATERIALS

A. Panel Type:

1. Core: Type X gypsum core with additives to enhance moisture and mold resistance.
2. Facing: Water-resistance glass mat on both face and back surfaces.
3. Long Faces: Wrapped with water-repellant glass mat.
4. Thickness: 1/2 inch.

B. Panel Physical Characteristics

1. Complies with ASTM C 1177/C1177M and C1396/C1396M.
2. Classification: Type X.
3. Racking Strength: 617 lbs/lin ft.
4. Humidified Deflection: Less than 1/8 inch.
5. Nail Pull Resistance: 80 lbs.
6. Water Absorption: less than 10%.
7. Permeance: greater than 10 perms.
8. Combustibility: Noncombustible.
9. Flame Spread/Smoke Developed: 5 / 0.
10. Mold/Mildew/Resistance: 10.

2.3 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
- B. Screws for Fastening Glass-Mat Gypsum Sheathing to metal stud framing: Sheet drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic polymer or other corrosion-protective coating have a salt-spray resistance of more than 800 hours according to ASTM B 117.

1. For steel framing from 0.0346 inch (20 gage) to 0.1017 inch (12 gage) thick, use screws that comply with ASTM C 954.

3.0 EXECUTION

3.1 INSTALLATION GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with manufacturer's standard instructions.
- D. Coordinate wall sheathing installation with flashing and weather-resistance barrier so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 GLASS-MAT GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
 1. Fasten glass-mat gypsum sheathing to cold-formed metal framing with screws.
 2. Install boards with 3/8 inch gap where non-loading construction abuts structural elements.
 3. Install boards with 1/4 inch gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.
 1. Space fasteners 8 inches on center and set back a minimum of 3/8 inch from edge and ends of boards.

3.6 CLEAN UP

- A. Clean all materials and attachments, mechanical and electrical items.
 - 1. Wipe clean, leaving work ready for finish specified under other Sections.
 - 2. As work is completed in each space, clean all rubbish, utensils and surplus materials from the space. Do not allow the accumulation of scraps and debris arising from work of this Section, maintain areas in a neat and safe condition at all times. Leave floors broom clean.

3.7 PROTECTION

- A. Provide protection to gypsum board construction free from damage or deterioration.

END OF SECTION

SECTION 062000 – FINISH CARPENTRY

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install interior trim and plywood as shown on project Drawings and as specified herein.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- E. Section 092900 - Gypsum Board: For provision of gypsum board.
- F. Section 099100 - Painting: For opaque finish of wood surfaces.

1.3 REFERENCES

- A. AISI - American Iron and Steel Institute
- B. ANSI - American National Standards Institute
 - 1. B18.2.1 - Square and Hex Bolts and Screws.
 - 2. B18.6.1 - Wood Screws (Inch Series).
- C. APA - American Plywood Association (APA)
 - 1. Guide to Plywood Grades.
- D. ASTM - American Society for Testing and Materials
 - 1. A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- E. USPS - United States Product Standard

1. PS1 - Construction and Industrial Plywood.

F. W1 - Woodwork Institute 1. Manual of Millwork.

G. WRCLA.- Western Red Cedar Lumber Association

1.4 SUBMITTALS

A. Product Data: Submit for all items.

B. Shop Drawings

1. Indicate dimensioned plans, sections, elevations, large scale details, location of each item, materials and wood species, component profiles, fastenings, jointing details, finishes, accessories, and schedule of finishes.

2. Follow WI standards for shop drawings.

C. Samples

1. Wood Items: Submit samples finished as specified.

a. Grade A plywood: 3 samples, tongue and groove, painted, 12 by 12 inches each.

b. At least 1 sample of finished solid stock showing complete range of variations in grain, color, and other features, minimum 6 inches width by 18 inches.

c. Samples shall be resubmitted for acceptable finish until approved by the Architect.

2. All metal trim pieces and mounting hardware in 6 inch lengths.

3. Provide 2' x 3' sample of assembled tongue and groove system including joint, end condition, and outside corner mounted on plywood backing using the Z-clips, showing fully coordinated assembly. Approval required prior to proceeding with mock-up described below.

D. Mock-up

1. Interior Plywood: Develop full wall mock-up as indicated on the drawings showing all joints. Approval by architect required prior to installation of paneling the remainder of project.

1.5 QUALITY ASSURANCE

- A. Plywood shall bear grade-trademarks of appropriate grading agency.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Acceptance at Site: Do not deliver interior finish carpentry until environmental conditions meet requirements specified for installation areas. If finish carpentry must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.
- B. Storage and Protection: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack plywood. Provide for air circulation within and around stacks and under temporary coverings.

2.0 PRODUCTS

2.1 MATERIALS

- A. Lumber Standards: Furnish lumber manufactured to comply with PS 20.
 - 1. Grade Stamps: Provide lumber with each piece factory marked with grade stamp evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.
 - 2. For exposed lumber, furnish pieces with grade stamps applied to ends or back of each piece, or omit grade stamps entirely and provide certificates of grade compliance issued by inspection agency.
- C. Paint Materials
 - 1. Back Priming Interior Plywood: As specified in Section 099000.
- D. Fasteners for Interior Finish Carpentry: Nails, screws, z-clips, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
 - 1. Provide fasteners and anchorages with hot-dip galvanized coating complying with ASTM A153.
 - 2. Use finish nails where exposed.
- E. Glue: Aliphatic or phenolic-resin wood glue recommended by manufacturer for general carpentry use.
- F. Interior Plywood: APA A-A, USPS PS1, Exposure 1, thickness as indicated.
 - 1. Formaldehyde and ammonia free core except as otherwise required for fire

treated material.

2. Fire Treatment As specified in Section 060573, for plywood used in electrical and telephone room.

G. Panel Hardware: Extruded clear anodized aluminum hardware and trim as indicated on drawings.

1. Extruded clear anodized aluminum end caps and corner trim as indicated on drawings.

2.2 INTERIOR WINDOWSILLS AND TRIM

A. Lumber Trim for Opaque Finish (Painted): Finished lumber (S4S), either finger-jointed or solid lumber, of one of the following species and grades:

1. Species: Sugar Pine or Ponderosa Pine.
 - a. Optional Material: Primed MDF of same actual dimensions as lumber indicated may be used in lieu of lumber.
2. Grade: WI Custom.

2.3 MISCELLANEOUS MATERIALS

A. Fasteners for Exterior Finish Carpentry: Provide nails or screws of the following materials, in sufficient length to penetrate minimum of 1-1/2 inches into substrate, unless otherwise recommended by manufacturer.

B. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment concealed where possible.

1. Where finish carpentry materials are exposed in areas of high humidity, provide fasteners and anchorages with hot-dip galvanized coating complying with ASTM A 153.

2.4 FABRICATION

A. Wood Moisture Content Comply with requirements of specified inspection agencies and manufacturer's recommendations for moisture content of finish carpentry on relative humidity conditions existing during time of fabrication and in installation areas.

B. Fabricate finish carpentry to dimensions, profiles, and details indicated.

1. Ease edges of lumber less than 1 inch in nominal thickness to 1/16-inch radius.

2. Ease edges of lumber 1 inch or more in nominal thickness to 1/8-inch radius.

2.3 FINISHES

A. Shop Finishing

1. Back Priming: Back prime all concealed wood surfaces.

B. Field Finishing

1. Transparent finish paint in accordance with requirements of Section 064100.
2. Opaque finish paint in accordance with requirements of Section 099000.

3.0 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with installer present, for compliance with requirements for installation tolerances and other conditions affecting installation and performance of finish carpentry. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Prime and backprime lumber for painted finish. Comply with requirements for surface preparation and application in Section 099000.

3.3 INSTALLATION, GENERAL

- A. Do not use finish carpentry materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
- B. Install finish carpentry plumb, level, true, and aligned with adjacent materials. Use concealed shims where required for alignment
 1. Scribe and cut finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 2. Countersink nails, fill surface flush, and sand where face nailing is unavoidable.

3. Install to tolerance of 1/8-inch in 96 inches for plumb and level. Install adjoining finish carpentry with 1/32-inch maximum offset for flush installation and 1/16-inch maximum offset for reveal installation.
4. Coordinate finish carpentry with materials and systems in or adjacent to standing and running trim and rails. Provide cutouts for mechanical and electrical items that penetrate exposed surfaces of trim and rails.
5. Align new materials with existing adjacent.

C. Finish Painting

1. Opaque: As specified in Section 099100.

3.4 STANDING AND RUNNING PANEL INSTALLATION

A. Install with minimum number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches long, except where necessary. Stagger joints in adjacent and related standing and running trim. Cope at returns and miter at comers to produce tight-fitting joints with full-surface contact throughout length of joint Use scarf joints for end-to-end joints. Plane backs of casings to provide uniform thickness across joints, if required.

1. Match color and grain pattern across joints.
2. Install trim after gypsum board joint finishing operations are completed.
3. Drill pilot holes in hardwood before fastening to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads on exposed carpentry work and fill holes.
4. Fit exterior joints to exclude water. Apply flat grain lumber with bark side exposed to weather.

B. Panel Installation

1. Install panels aligned and leveled. Provide pre-finished trim at all edges, and corners.

3.5 WOODSILL AND TRIM INSTALLATION

A. Install with minimu number of joints practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 36 inches long, except where necessary. Stagger joints in adjacent and related standing and running trim. Cope at returns and miter at corners to produce tight-fitting joints with full-surface contact throughout length of joint. Use scarf joints, where necessary for alignment.

1. Install trim after gypsum board joint finishing operations are completed.
2. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base if finished.
3. Drill pilot holes in hardwood before fastening to prevent splitting. Fasten to prevent movement or warping. Countersink fastener heads on exposed carpentry work and fill holes.

3.6 ADJUSTING AND CLEANING

- A. Repair damaged or defective finish carpentry where possible to eliminate functional or visual defects. Where not possible to repair, replace finish carpentry. Adjust joinery for uniform appearance.
- B. Clean finish carpentry on exposed and semi-exposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

END OF SECTION

SECTION 064116 - PLASTIC LAMINATE-CLAD ARCHITECTURAL CABINETS

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
 - 1. Provide and install architectural casework surfaced in plastic-laminate as shown on project Drawings and as specified herein, including bases, uppers, and countertops, complete with hardware and accessories.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 055000 - Miscellaneous Metals
- C. Section 064196 - Quartz Agglomerate Countertops
- D. Section 079000 - Sealants and Caulking
- E. Section 088100 - Glass and Glazing
- F. Section 092900 - Gypsum Board
- G. Section 096500 - Resilient Flooring
- H. Section 099100 - Painting
- I. Division 26, Electrical

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM D256 - Standard Test Method for Determining the Pendulum Impact Resistance of Notched Specimens of Plastics.
 - 2. ASTM D638 - Standard Test Method for Tensile Properties of Plastics.

3. ASTM D696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30 Degrees C and 30 Degrees C.
 4. ASTM D1037 - Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials
 5. ASTM E84 - Standard Test Method for Surface Burning Characteristics
 6. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
 7. ASTM G22 - Standard Practice for Determining Resistance of Plastics to Bacteria.
- B. American National Standards Institute (ANSI):
1. ANSI A208.1
 2. ANSI A208.2
- C. BHMA – Builders Hardware Manufacturing Association
1. A156.9 – Cabinet Hardware.
- D. U.S. Department of Commerce, National Institute of Standards and Technology
1. PS 1 – U.S. Product Standard for Construction and Industrial Plywood.
 2. PS 20 – U.S. Product Standard for American Softwood Lumber Standard.
- E. Woodwork Institute (WI)'s Manual of Millwork, 2001.

1.4 SUBMITTALS

- A. Comply with provisions of Section 013300, Submittal Procedures.
- B. Product data: Within 5 calendar days after the Contractor has received the Client's Notice to Proceed, submit:
 1. Manufacturer's recommended methods of installation which, when approved by the Architect, will become the basis for acceptance or rejection of actual installation procedures used on the work of this Section.
 2. Manufacturer's MSDS for all adhesives and sealants.
 3. Written assurance that contract schedule shall be met.

C. Shop Drawings:

1. Submit size shop drawings complete with hardware, drawers, and adjustable shelves.
 - a. Show materials, dimensions, cabinet cut details, anchoring devices, spacing and sizes, and sink locations.
 - b. Indicate dimensioned plans, sections, elevations, large scale details, location of each item, materials and wood species, component profiles, fastenings, jointing details, finishes, accessories, hardware location and schedule of finishes.
 - c. Follow WI standards for millwork shop drawings.
 - d. Coordinate scribes and fillers where Owner furnished appliances and equipment are installed in casework and counters.
 - e. Show relation of material furnished under this Section to work of other trades.
 - f. Confirm all dimensions and installation conditions prior to fabrication.
 - g. Provide though Procore submittal process.

D. Samples

1. Plastic Laminate: 12 inches by 12 inches, each color and pattern.
2. Sample of each type of hardware proposed for use.

E. Certification: See Article 1.04, "Quality Assurance" for requirements.

1.5 QUALITY ASSURANCE

A. Qualifications

1. Manufacturer. Company specializing in manufacturing the products specified in this Section with minimum 5 years of experience.

B. Furnish and install cabinet work in accordance with the standards and details of premium grade according to the "Manual of Millwork", WI.

1. All work shall conform to the California Building Code in effect at time of project approval.

2. Before delivery to the job site, the supplier shall issue a WI Certified Compliance Certificate or Certificate of Reinspection indicating the products that will be furnished for this job and certifying that they will fully meet all the requirements of the grade or grades specified.
 3. The shop drawings for the casework shall bear the WI Certified Compliance Label indicating that drawings fully meet the requirements of the WI grade specified.
 4. Each unit of casework shall bear the WI Certified Compliance Label indicating that the cabinets fully meet the requirements of the WI grade specified.
 5. Each countertop shall bear the WI Certified Compliance Label indicating the tops fully meet the requirements of the WI grade specified. Issue WI certified compliance certificate for installation at completion of installation.
 6. Compliance with Standards:
 - a. In the event such inspection determines that materials do not comply with the referenced standards, the Contractor shall pay the costs of the inspection and shall immediately replace the non-complying work with items complying with the referenced standards as specified in this Section, all at no additional cost to the District.
- C. First-class quality of casework shall be established by use of proper machinery, tools, jigs, hardware and skilled workmanship. Fabricate veneer panels on stainless steel or chrome equipment Rust stains on panels will be cause for rejection.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle products to site under provisions of Division 1.
- B. Deliver finish carpentry items to job site only after proper facilities are available for handling, sorting and protecting items; receiving areas are broom cleaned; and all plaster work is dry, mechanical and electrical rough-ins are completed.
- C. Deliver all materials to site in manufacturer's original unopened packaging, with labels clearly identifying product name and manufacturer.
- D. Store materials indoors in a clean and dry area in accordance with manufacturer's recommendations. Keep material dry at all times. Protect panels against exposure to weather and contact with damp or wet surfaces.
- E. Store materials on a flat, level surface with adequate support to prevent sagging.

1. Stack materials in a manner to provide air circulation within and around stacks and under temporary coverings, including polyethylene and similar materials.
 2. For materials pressure-treated with water borne chemicals, provide for air circulation at each course.
- F. Condition materials to final environment for 48 - 72 hours prior to installation and finishing.
- G. Use all means necessary to protect materials before, during, and after installation and to protect the installed work and materials of all other trades.
- H. In the event of damage, immediately make all necessary repairs and replacements to the approval of the Architect and at no additional cost to the Client.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify field measurements.

1.7 COORDINATION

- A. Coordinate the work with plumbing and electrical rough-in.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Plywood Panels: SierraPine, 3010 Lava Ridge Court, Suite 220, Roseville, CA 95661, 1-916-772-3422, www.sierrapine.com, or approved equal.
- B. Laminated Plastic: Wilsonart International, 2400 Wilson Place, Temple, TX, 76503, 1-800-433-3222, www.wilsonart.com.

2.2 MATERIALS

- A. Plywood Panels: Softwood Plywood Panel
1. Wood fiber: 100% post-industrial recycled wood material
 2. Binder: Formaldehyde-free adhesive system
 3. Panel Thickness: 3/4 inch
 4. Conformance: ANSI A208.2 industrial-grade MDF
- B. Plastic Laminate

1. High pressure plastic laminate in accordance with NEMA LD-1 standards unless otherwise indicated.
 - a. Particleboard: Minimum density of 45 pounds per cubic foot; moisture content not to exceed 8 percent.
 - b. Exposed exterior surfaces shall be 0.030-inch minimum thickness high pressure plastic laminate.
 - c. Exposed edges of cabinets, drawers, and doors shall be edged with 3-mil PVC tape matching the plastic laminate facing plastic laminate.
 - d. Exposed edges of countertops shall be edged with 3-mil PVC tape. Submit color chart to architect for selection and approval.
 - e. Color: See schedule
 - f. Contractor to verify that color selection is available to meet project schedule.
 2. Semi-exposed surfaces shall be laminated with light color high pressure plastic laminate cabinet liner 0.020-inch thickness except visible surfaces of open cabinets shall be 0.030-inch thick high pressure plastic laminate. Interior exposed shelf edges shall be self edged with PVC tape.
- C. Adhesives:
1. Adhesives used shall be approved by the manufacturer of the materials specified herein, as specified in manufacturer's printed installation instructions.
- D. General Construction
1. Doors, shelves, bases, ends, and dividers shall be 3/4-inch thick.
 2. All bases and framing members shall be doweled into end panels and secured with glue and screws.
 3. Backs shall be rabbeted, set flush into end panels, and secured with screws.
 4. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fittings. Verify location of cutouts from on-site dimensions.
- E. Drawers
1. Drawer fronts shall be 3/4-inch plastic laminate on exposed face and plastic laminate cabinet liner on interior surfaces.

2. Drawer sides and backs shall be laminated on both sides with plastic laminate cabinet liner.
 3. Drawer bottoms shall be fully housed into front, sides and back.
- F. Shelves: Adjustable
- G. Fasteners: Size and type to suit application.
- H. Hardware: Provide all hardware as shown and required per WI requirements of Supplement #1 of the WI Manual with the following stipulations:
1. Finish: US26D, Satin chrome.
 2. Shelf Standards and Rests: Provide hold-down clips.
 3. Drawer and Door Pulls: Wire pull design, 4 inch centers.
 4. Catches: Manufacturer's option.
 5. Drawer Slides: Full extension type, heavy duty.
 6. Hinges: European style. Grade 1, semi-concealed, 270-degree opening.
 7. Draw Bolts: As specified above.
 8. Cabinet Locks: Recessed locks, 7/8 inch diameter, 3/4 inch length, National, Corbin or equal.

2.3 COUNTERTOPS

- A. Quartz Agglomerate Countertop: As specified in Section 123661
- B. Plastic Laminate-Clad Countertops: As specified in schedule.
1. Core Material: Exterior-grade plywood
 2. Core Thickness: 3/4", unless otherwise specified on drawings
 - a. Build up countertop thickness to 1-1/2" at front, back, and ends with additional layers of core material laminated on top, unless otherwise specified on drawings.
 3. Paper backing: Provide paper backing on underside of countertop substrate.
- C. Accessories

1. Grommets; Plastic countertop inserts with closure plugs in sizes and configurations as indicated.

2.4 FABRICATION

A. General:

1. Refer to Drawings for locations, type, and size of casework.
2. Fabricate all architectural wood casework in strict accordance with the referenced standards and the approved Shop Drawings.
3. Verify location, detail, and dimensions of electrical receptacles and switches to ensure proper fit and accurate alignment integral with casework and other items.
4. Coordinate details with other work supporting, adjoining, or fastening to casework and other items.
5. Fabricate paneling to dimensions, profiles and details indicated with openings pre-cut, where possible, to accommodate other items and work. Complete fabrication, assembly, finishing, and other work before shipment to project site to maximum extent possible. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming and fitting.
6. All casework shall meet WI standards.
7. Materials, hardware, component construction:
 - a. Hinges: Blum #71T5580, 120 degrees concealed, self-closing
 - b. Shelf supports: Aluminum and Steel standards with related supports
 - c. Cabinet pulls: 4 inch U-pulls at cabinets/casework for accessible storage per 1125B.4 (see details for specific hardware for access doors and vents)
 - d. Cabinet locks to be on all cabinet doors and drawers and keyed alike: National #C8173-26D
 - e. When a horizontal grain finish is used insert Schluter System .344-in W x 98.5-in L aluminum edge trim inbetween sheets.

2.3 SCHEDULE

Reference #	Location	Series	Color	Grain Orientation
-------------	----------	--------	-------	-------------------

PL-1	Doors, frames, end panels	Wilsonart Premium Laminate Linearity Finish with Aeon #18	Asian Sand #7952K	Horizontal
PL-2	Adjustable shelves, interior	Wilsonart Standard Laminate Matte Finish	Alabaster #D431-60	Horizontal
PL-3	Countertops	Wilsonart Standard Laminate Matte Finish	Grey #1500-60	Horizontal
Note: Verify location, type and size with drawings				
Quartz Agglomerate Countertops - See section 123661				
Note: Verify location, type and size with drawings				

3.0 EXECUTION

3.1 SURFACE CONDITIONS

A. Field Measurements:

1. Take all necessary measurements in the field to ensure proper dimensions for materials.

B. Inspection:

1. Prior to installation of the work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where the installation included in this Section may properly commence.
2. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.
3. Verify that materials may be installed in accordance with the original design and the approved Shop Drawings.

C. Discrepancies:

1. In the event of a discrepancy, immediately notify the Architect.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.1 COUNTERTOP

- A. Run counter continuous over base cabinets, equipment and spaces as shown.
- B. Provide splash at end where top is adjacent to wall or any equipment, fixed or movable, unless otherwise shown.
- C. Scribe to wall or other adjacent materials leaving a gap of 1/16-inch minimum. Use sealant of an approved color to seal gaps.
- D. Verify finish field dimensions.

3.2 INSTALLATION

A. General:

- 1. Precondition surfacing materials and surfaces to receive surfacing materials in accordance with manufacturer's printed installation instructions.
- 2. Install the approved laminated plastic in strict accordance with the manufacturer's recommendations as approved by the Architect.
- 3. Install all materials and accessories true, square, plumb, level, and firmly anchored for long life under hard use.
- 4. Scribe and closely fit all items, concealing all fastenings and setting all nails for putty.

B. Trim:

- 1. Install all trim in pieces as long as possible and where joints are unavoidable, join only where solid fastening can be made.
- 2. Cope all interior angles; miter all exterior angles; miter or scarf all end-to-end joints.
- 3. Make all joints to exclude water and seal in waterproof glue or caulking as described in Section 079000, Sealants and Caulking.

C. Finishing:

- 1. No coarse-grained sandpaper mark, hammer mark, or other imperfection will be permitted.

3.3 SCHEDULE

- A. Verify location, type and size of cabinetry with drawings before installation.

3.3 FINAL INSPECTION

- A. Prior to final inspection and acceptance by the Architect, completely check each installed item; touch-up all scratches and imperfections of finish for the approval of the Architect.

3.4 CLEAN UP

- A. Each day, or more often if required, during the execution of this portion of the work thoroughly sweep down the areas in which finish carpentry is being performed and remove all debris resulting from this installation, leaving the buildings and site in a neat and orderly condition.
- B. Upon completion, clean the work of this Section in accordance with recommendations of the manufacturer(s) of the materials used.
- C. Remove all debris resulting from this work.

3.5 WARRANTY

- A. The products delivered shall be free of defects.
- B. Manufacturer's standard performance warranty, as available for specified installation and environmental conditions.

END OF SECTION

SECTION 064196 – QUARTZ AGGLOMERATE COUNTERTOPS

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install quartz agglomerate countertops including hardware as shown on project Drawings.
- D. Section includes:
 - 1. Quartz agglomerate surfacing countertops
 - 2. Quartz agglomerate backsplashes
 - 3. Quartz agglomerate end splashes
 - 4. Quartz agglomerate vanities
 - 5. Adhesives and sealants

1.2 RELATED SECTIONS

- A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 061000 - Rough Carpentry
- C. Section 064116 - Plastic Laminate-Clad Architectural Cabinets
- D. Section 079000 - Sealants and Caulking

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM C97 – Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.

2. ASTM C170 – Standard Test Method for Compressive Strength of Dimension Stone.
3. ASTM C501 – Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by Taber Abraser.
4. ASTM C834 – Standard Specification for Latex Sealants.
5. ASTM C920 – Standard Specification for Elastomeric Joint Sealants.
6. ASTM D790 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulation Materials.
7. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
8. ISO – International Organization of Standardization.
9. ISO 9001 – Quality Management Systems.
10. NSF/ANSI Standard 51 – Food Equipment Materials.
11. SCAQMD Rule 1168 – Adhesive and Sealant Applications.
12. UL 2818 – GREENGUARD Certification Program for Chemical Emissions for Building Materials, Finishes, and Furnishings.

1.4 SUBMITTALS

- A. Comply with provisions of Section 013300, Submittal Procedures.
- B. Product Data: For countertop materials.
 1. For each time, dimensional plans and elevations, large scale details, attachment devices and other components.
 2. Submit data for each specified product. Include manufacturer's technical data sheets and polished installation instructions.
- C. Material Safety Data Sheets (MSDS) for products and accessories
- D. Shop Drawings: Provide plans, sections, and large-scale details. Include attachment provisions and fabrication methods. Include joinery, edge conditions, terminations, substrate construction, cutouts, and holes.
 1. Show locations and details of joints.
 2. Show plumbing installation provisions.

- E. Samples for Verification:
1. Countertop material, 6 inches (150 mm) square.
 2. One full-size quartz agglomerate countertop, with front edge and backsplash, 8 by 10 inches (200 by 250 mm), of construction and in configuration specified.
- F. Information Submittals:
1. Qualifications Data: For fabricator.
 2. Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties.
 3. Warranty: Submit specimen copy of specified warranty.
- G. Quality Assurance Submittal: Submit certified test reports showing compliance with specified performance characteristics and physical properties.
1. Fabricator Qualifications: Minimum of five years documented installation experience for projects similar in scope and complexity to this Project, and currently certified by the manufacturer as an acceptable installer.
 2. Certificates: Copies of ISO certifications.
 3. Test Reports:
 - a. Flammability test reports
 - b. Food preparation zone use test reports.
 4. Manufacturer's Fabrication and Installation Manual
 5. Manufacturer's Fabrication and Installation Check List
- H. Closeout Submittals: Submit the following:
1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Section 017700, Contract Closeout Procedures. Include methods for maintaining installed products, precautions against cleaning materials, methods detrimental to finishes and performance, and special warranties. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Fabricator/Installer Qualifications: Minimum three years experience in fabrication and installation of quartz Surface materials or certification by Distributor.
- B. Certifications:
 - 1. Manufacturer must hold current ISO 9002 and 14001 certificates
- C. Applicable Standards:
 - 1. American National Standards Institute (ANSI)
 - 2. American Society for Testing and Materials (ASTM)
 - 3. National Electrical Manufacturers Association (NEMA)
- D. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and execution.
 - 1. Build mockup of typical countertop as shown on Drawings.
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed work if undisturbed at time of substantial completion.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Reference Section 016000–Product Requirements.
- B. Follow manufacturer’s instructions.
- C. Special Instructions: do not deliver components to project site until spaces are ready for installation.

1.7 PROJECT CONDITIONS

- A. Environmental Requirements: Installation spaces must be maintained at normal occupancy temperature and humidity levels for minimum 72 hours prior to and continuously following installation.
- B. Adhesives: Acclimate adhesives to occupancy room temperatures with maximum temperature not to exceed 75 deg F (24 deg C)
- C. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays. Coordinate locations of utilities that will penetrate countertops or backsplashes.

1.8 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
- C. Special Warranty: Ten year limited warranty against manufacturing defects in slab material.

1.9 MAINTENANCE

- A. Extra Materials: Provide for future repair use by Owner.
 - 1. Minimum 4 sf (0.37m²) per 50 lf (15 m) of each countertop color.
 - 2. Color shall be from same dye-lot as installed countertops.

2.0 PRODUCTS

2.1 MANUFACTURER

- A. Wilsonart International, 2400 Wilson Place, Temple, TX, 76503, 1-800-433-3222, www.wilsonart.com

2.2 MATERIALS

- A. Materials: Composition – 93 percent quartz aggregate combined with polyester resin binders and proprietary pigments that are fabricated into slabs using Bretonstone vacuum vibrocompaction technology.
 - 1. Material shall have minimum physical and performance properties specified.
 - a. 3 cm (1-1/4”) product is typically for horizontal installation and 2 cm (3/4”) product is typically for both horizontal and vertical installations.
 - b. See manufacturer’s product data for panel size limitations.
 - c. The thicker the material, the more the cost in both product and labor.
- B. Thickness: 2 cm (3/4”)
- C. Edge Treatment: Straight

- D. Quartz Finish: Polished finish with Glossometer reading greater than 45.
- E. Seam Width: Less than 1/16" unless otherwise noted
- F. Sink Mounting:
 - 1. Under-mount
 - 2. Drop In
- G. Backsplash: Applied, dimension as shown on drawings
- H. Endsplash: Applied
- I. Performance Characteristics: Reference Radianz Quartz Surface physical properties data sheet
- J. Core Material
 - 1. Material: Exterior Grade Plywood
 - 2. Core Thickness: 3/4", unless otherwise specified on drawings
 - a. Build up countertop thickness to 1-1/2" at front, back, and ends with additional layers of core material laminated on top, unless otherwise specified on drawings.
 - 3. Paper backing: Provide paper backing on underside of countertop substrate.

2.3 ACCESSORY PRODUCTS

- A. Adhesives to create color-matched seams
- B. Physical Performance Characteristics:
 - 1. Flexural Strength: Greater than 4,500 psi (31.0 MPa); ASTM D 790.
 - 2. Flexural Strain: Less than 0.375 percent; ASTM D 790.
 - 3. Flexural Modulus: Greater than 3.75 MPsi; ASTM D 790.
 - 4. Stain resistance (24 Hour): No effect to moderate effect; NEMA LD-3.
 - 5. Abrasion Resistance: Greater than 100 in. lbs.; ASTM C 501.
 - 6. Density: Greater than 2.1 g/.cu. m per ASTM C 97.

7. Compressive Strength (One Axis - Div.): Greater than 20,000 psi (138 MPa) per ASTM C 170.
8. Moisture Absorption: Less than 0.03 percent per ASTM C 97.
9. Surface Burning Characteristics: Class I and Class A per ASTM E 84.

2.4 FABRICATION

- A. Weight of product is approximately 12 – 15 PSF and is typically field assembled.
- B. Shop Assembly: Fabricate components in shop to the greatest extent practical, using manufacturer's printed instructions and technical bulletins.
 1. Avoid seams within 3" (75 mm) of inside or outside corners.
 2. Joint locations: Not within 18" of a sink or cooktop and not where a countertop section less than 36" long would result, unless unavoidable.
- C. Provide holes and cutouts for penetrations and sinks and bowls as shown on Drawings and scheduled in other sections. Form cutouts to required template or pattern, with smooth, even curves and eased edges.

2.5 FINISHES

- A. Color: Rio Upano Q3008

3.0 EXECUTION

3.1 EXAMINATION

- A. Examine cabinets upon which countertops will be installed.
 1. Verify that cabinets are level to 1/8" in 10'.
 2. Review manufacturer's Fabrication and Installation Check List.
- B. Coordinate with responsible entity to correct unsatisfactory conditions.
- C. Commencement of work by installer is acceptance of cabinet conditions.

3.2 INSTALLATION

- A. Install countertops and secure to cabinets in accordance with manufacturer's Fabrication and Installation Manual.
- B. Install Sinks and Bowls:

1. Mounting Type: [Under mount] [Drop In] [As shown on Drawings].
2. Secure under mount sinks and bowls to countertops with clip system as recommended by manufacturer.

3.3 REPAIR

- A. Repair minor imperfections and cracked seams in accordance with manufacturer's Fabrication and Installation Manual.
- B. Remove and replace quartz surfacing components that are damaged and cannot be satisfactorily repaired.

3.4 CLEANING

- A. Remove temporary coverings and protection of adjacent work areas.
- B. Repair or replace any damaged products of this Section.
- C. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance.
- D. Remove construction debris from project site and legally dispose of debris. Leave site in a neat and clean condition.

3.5 PROTECTION

- A. Cover surfaces in accordance with manufacturer's Care and Maintenance Instructions.

END OF SECTION

SECTION 068200 - FIBERGLASS REINFORCED PLASTIC PANELS

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install full-height fiberglass reinforced plastic wall panels including fasteners, adhesive and trim as shown on project Drawings.

1.2 RELATED WORK

- A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 079000 - Sealants and Caulking
- C. Section 092900 - Gypsum Board
- D. Section 099565 - Epoxy Coatings

1.3 REFERENCES

- A. ASTM D2583 Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
- B. ASTM D5319 Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.
- C. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.

1.4 SUBMITTALS

- A. Comply with pertinent provisions of Section 01300, Submittal Procedures.
- B. Product Data: Submit product data, including manufacturer's product sheet, for specified products.
- C. Shop Drawings:

1. Submit shop drawings showing layout, profiles and product components, including anchorage, accessories, finish colors, patterns and textures.
 - a. Indicate location and dimension of joints and fastener attachments.

D. Samples:

1. Submit selection and verification samples for finishes, colors and textures.
2. Submit 3 inch ∞ 3 inch samples of each surface and color required.
3. Submit 3 inch samples of each trim profile and trim color required.

E. Quality Assurance Submittal: Submit the following:

1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics, criteria and physical requirements.
3. Manufacturer's Instructions: Submit manufacturer's Installation Guide #2505, and submit manufacturer's information for recommended methods of cleaning, including cleaning materials and methods of application with precautions.

F. Closeout Submittals: Submit the following:

1. Operation and Maintenance Data: Operation and maintenance data for installed products in accordance with Division 1 Closeout Submittals Section. Include methods for maintaining installed products and precautions against cleaning materials and methods detrimental to finishes and performance.
2. Warranty: Warranty documents specified herein.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Installer Qualifications: Installer should be experienced in performing work of this section and should have specialized in installation of work similar to that required for this project.
2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction and capable of approving application method.

- B. Mock-Ups: Install at project site a job mock-up using acceptable products and manufacturer approved installation methods. Obtain District and Architect acceptance of finish color, texture, pattern and workmanship standards.
 - 1. Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legally dispose of mock-up when it is no longer required.
 - 2. Incorporation: Mock-up may be incorporated into final construction upon District's approval.
- C. Source Quality: Obtain fiberglass reinforced plastic (FRP) panels from a single manufacturer. Provide panels and molding only from manufacturer specified to ensure warranty and color harmonization of accessories.
- D. Extra Materials: Deliver to District extra materials from same production run as products installed. Package products with protective covering and identify with descriptive labels. Comply with Division 1 Closeout Submittals Section.

1.6 DELIVERY, STORAGE & HANDLING

- A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Package sheets on skids or pallets for shipment to project site.
- C. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
 - 1. Store products indoors and protect from moisture, construction traffic and damage.
 - 2. Store panels flat on clean, dry surface. Do not stand on edge or stack on fresh concrete or other surfaces that emit moisture.
 - 3. Store panels at least 24 hours with temperature and humidity conditions approximating the average environment of the finished room.
- D. Handling: Remove foreign matter from face of panel by use of a soft bristle brush, avoiding abrasive action.

1.7 PROJECT CONDITIONS

- A. Environmental Requirements:

1. Installation shall not begin until building is enclosed, permanent heating and cooling equipment is in operation and residual moisture from plaster, concrete or terrazzo work has dissipated.
 2. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.
 3. Provide ventilation to disperse fumes during application of adhesive as recommended by adhesive manufacturer.
- B. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.8 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for District's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights District may have under Contract Documents.

2.0 PRODUCTS

2.1 MANUFACTURER

- A. Crane Composites, 23525 W Eames Street, Channahon, IL 60410, 1-815-467-8600, www.cranecomposites.com

2.2 MATERIALS

- A. Varietex Class C Fire-Rated, .09" (2.3 mm)
 - a. Size: 48"W and shall run from cove to ceiling; refer to Drawings.
- B. Rivets: Nonstaining nylon drive rivets shall be used and shall match panel colors and length to suit project conditions.
- C. FRP Moldings: Manufacturer standard vinyl molding matching the color of panels. 1-1/2 inch corner moldings and other moldings as indicated from a single production run for uniformity of color.
- D. Aluminum Reglet: As specified in Section 09250, Gypsum Board.

E. Certification:

- a. Flame spread 25 or less, smoke developed 450 or less (per ASTM E-84).
- b. Meets USDA/FSIS requirements.
- c. UL Classified.

2.3. SCHEDULE

Reference #	Series	Style	Color
FRP-1	Varietex	Linen Texture	1130 Cotton White
FRP-2	Varietex	Linen Texture	1289 Cades Cove
Note: Verify location, type and size with drawings			

2.4 ACCESSORIES

- A. Adhesive: Nontoxic, non-allergenic adhesive recommended by the wall covering manufacturer and meeting Code requirements for flammability and toxicity.
- B. Sealant: As specified in Section 079000, Sealants and Caulking.

3.0 EXECUTION

3.1 EXAMINATION

- A. Site Verification of Conditions: Verify that substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.
- B. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails are countersunk, and joints and cracks are filled flush and smooth with the adjoining surface.
- C. Do not begin installation until backup surfaces are in a satisfactory condition.

3.2 FABRICATING RECOMMENDATIONS

- A. Note: Protect your eyes with goggles and cover your nose and mouth with a filter mask when cutting panels.
- B. Hand fabrications: Drilling high-speed drill bit (60 degree cutting angle with 12 degree to 15 degree clearance) or hole saw.
- C. Cutting: Sheet metal shears or circular saw with reinforced carborundum or carbide tipped blade.

- D. Production fabrications: Use carbide-tipped tools. Straight cuts can be sheared (90 degree cutting edge with 0.002 inch clearance) or sawed. For irregular cuts, use die punch or band saw.

3.3 INSTALLATION

- A. Comply with manufacturer's recommended methods of installation, only using products that are acceptable to panel manufacturer.

- B. FRP Installation:

1. Carefully locate penetrations and openings through paneling, including electrical outlets and piping, and provide minimum sized openings as required. Size openings so they will be covered by switch plates, flanges and other required trim.
2. Cut and drill panels with carbide tipped saw blades or drill bits, or cut with snips.
3. Install panels with manufacturer's recommended gap for panel field and corner joints.
4. Predrill fastener holes in panels with 1/8 inch oversize.
5. For trowel type and application of adhesive, follow adhesive manufacturer's recommendations.
6. Butt joints for an even and tight fit along entire length of joint. Make joints plumb and level.
7. If a vertical splice is required and is acceptable to the Architect, balance the splice symmetrically with the length of the wall so that each run is not less than 2 feet long.
8. Glue paneling securely to substrate.

- C. Trim and Molding Installation:

1. Provide trim and molding at all edges of paneling.
2. Install true to line.
3. Use full-length stock trim and moldings for run less than or equaling the stock length.
4. Miter corners as necessary.

3.4 FINISHED PANEL QUALITY

- A. Panels shall have a wear side with a pebble-like embossed or smooth finish. Color shall be uniform throughout, as specified. The backside shall be smooth. Backside imperfections which do not affect functional properties are not cause for rejection.

3.5 CLEAN UP

- A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to District's acceptance. Remove construction debris from project site and legally dispose of debris.
- B. Remove any excess adhesive or sealant from panel face or joints immediately using solvent or cleaner recommended by panel manufacturer.
- C. Remove scraps and debris from the site, and leave in a neat and clean condition.

END OF SECTION

**Division 7:
Thermal & Moisture
Protection**

SECTION 071000 – CONCRETE WATERPROOFING

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section. Including but no limited to:
 - 1. Fluid applied waterproofing membrane, including surface conditioner and drainage composite.
 - 2. Filter Fabric

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- C. Section 033000 – Cast in Place Concrete
- D. Section 312333 – Trenching, Backfilling and Compacting
- E. Section 334000 – Storm and Sewage Systems

1.3 REFERENCES

- A. ASTM D E96 – Test Methods for Water Vapor Transmission of Materials

1.4 QUALITY ASSURANCE

- A. Waterproofing shall be installed only by manufacturer's approved applicator.
- B. Perform Work in accordance with manufacturer's instructions, as shown, and – for conditions not instructed or shown – NRCA Waterproofing Manual.

1.5 SUBMITTALS

- A. Comply with pertinent provisions of Section 013300, Submittal Procedures.
- B. Product data: Within 5 calendar days after the Contractor has received the City's Notice to Proceed, submit:

1. Data for surface conditioner, drainage composite, and joint and crack sealants, with temperature range for application of waterproofing membrane.
- C. Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.
- D. Manufacturer's Installation Instructions: submit special procedures and perimeter conditions requiring special attention.
- E. Warranty: Submit manufacturer's warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store materials undamaged in original containers with manufacturer's labels and seals intact.

1.8 ENVIRONMENTAL REQUIREMENTS

- A. Maintain ambient temperatures above 40°F for 24 hours before and during application and until liquid or mastic has cured.

2.0 PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

- A. Waterproofing Membrane: American Hydrotech, Inc. "Monolithic Membrane 6125 – Standard Assesmbly", or approved equal.
- B. Drainage Composite: American Hydrotech "Hydrodrain 420", or approved equal.
- C. Filter Fabric: US Fabrics Inc., US 80NW, non woven fabric, 150 gal/min/sf flow rate.
- D. Accessories: Surface Conditioner for Waterproof Membrane: Manufacturer's required product.

3.0 EXECUTION

3.1 EXAMINATION

- A. Surface Condition: Surfaces shall dry, clean, firm, and free from dust, dirt, oil, and all other foreign matter that may be detrimental to the performance of the membrane.
- B. Damaged surfaces, including voids, cracks and holes, shall be repaired before work of this section begins.

- C. Do not begin work until satisfactory conditions have been met.

3.2 INSTALLATION

- A. Apply waterproofing system in accordance with manufacturer's instructions, unless otherwise shown.
- B. Prior to application of membrane, apply surface conditioner as a fine spray evenly at the rate recommended by the manufacturer and allow to dry.
- C. Waterproofing membrane shall be applied evenly at a rate to provide a continuous coating. Apply a uniform thickness equal to the minimum recommended by manufacturer. Minimum shall not be an average, but an actual minimum as measured at any location.
- D. Apply drainage composite over waterproof membrane with fabric face toward backfill material. Overlap panel edges by 2", dimples into dimple.
- E. Wrap filter fabric over perforated drain pipe before backfilling. Cover all exposed surfaces of pipe and extend out on both sides enough to be held in place by backfill. Overlap edges along length of pipe.

END OF SECTION

SECTION 072116 - BLANKET INSULATION

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install building insulation as indicated on the project Drawings and as specified herein, including insulation of roof areas, ceiling areas, sound insulation of interior walls, and insulation of exterior walls.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 074113 – Metal Roof Panels
- C. Section 092900 - Gypsum Board
- D. Section 133419 - Metal Building Systems

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM C665 – Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - 2. ASTM E84 – Test Method for Surface Burning Characteristics of Building Materials.
- B. National Fire Protection Association (NFPA):
 - 1. Test of Surface Burning Characteristics of Building Materials.
- C. Underwriters Laboratories, Inc. (UL):
 - 1. UL 723- Tests for Surface Burning Characteristics of Building Materials.
- D. California Building Code, 2016.

1.4 SUBMITTALS

- A. Comply with pertinent provisions of Section 013300, Submittal Procedures.

1.5 PRODUCT HANDLING

- A. Deliver materials to the site and store in a safe dry place with all labels intact and legible at time of installation.
- B. Use all means necessary to protect insulating materials before, during and after installation and to protect the installed work and materials of other trades.

2.0 PRODUCTS

2.1 MANUFACTURER

- A. Johns Manville, www.jm.com, 1-800-654-3103, or approved equal.

- 1. Batt Insulation: Formaldehyde-Free Foil-Faced Batts.
- 2. Semi-Rigid Insulation: Insul-SHIELD I/S 225.

2.2 MATERIALS

- A. General:

- 1. Comply with California Energy Code, CCR Title 24, Part 6, Subchapter 2, Section 118: Certification that insulation complies with California Quality Standards for Insulating material (CCR Title 20, Chapter 4, Article 3.)
- 2. Comply with California Building Code Section 707: Flame spread rating not to exceed 25 and smoke density not to exceed 450 when tested in accord with UBC Standard 8-1.
- 3. Products shall be formaldehyde free.

- B. General: Flame Spread for all insulation specified herein shall be 25. Smoke Developed shall be 50.

- C. Thermal Insulation:

- 1. ComfortTherm - Poly-encapsulated formaldehyde-free Thermal fiber glass insulation:
 - a. R25 in Exterior Walls—metal panel siding

Thickness: 8-1/4 in.

Width: 15 in.

b. R21 in Interior Walls—cold formed metal framing

Thickness: 5-1/2 in.

Width: 15 in.

c. R30 in Ceilings

Thickness: 10-1/4 in.

Width: 24 in.

D. Batt Insulation: Type III, Class B, Category 1 (ASTM C665); preformed glass batt; conforming to the following.

1. Thermal Resistance: R13 minimum.
2. Faced on one side with foil reinforced Kraft vapor retarder.
3. Bright aluminum self-adhering type, mech reinforced, 2 inch wide tape.
4. Stick pins with caps; no self-sticking pins.
5. Neoprene rubber acoustic deck closures, minimum 40 pcf density, Class 1 listing per UBC Standard 8-1 (ASTM E84) or UL 94; shaped to fit tight into metal deck flutes.

E. Acoustical Insulation:

1. Unfaced formaldehyde-free fiber glass sound control batt insulation:
 - a. Interior walls: R13.

F. Semi-Rigid Insulation: Type IB, Category 2 (ASTM C112); semi-rigid roll product.

1. Thermal Resistance: R13 minimum.
2. Faced on one side with foil reinforced Kraft vapor retarder.
3. Stick pins with caps; no self-sticking pins.

3.0 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
2. Verify that building insulation may be installed in accordance with the original design and the manufacturer's recommendations.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Architect and County Representative.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 INSTALLATION

A. General:

1. Except as otherwise directed by the Architect, install all insulation in accordance with instructions of the manufacturer.

B. Inspection:

1. Upon completion of the installation, visually inspect each insulated area and verify that all insulation is complete and properly installed.

3.3 CLEANUP

- A. Upon completion, remove all debris resulting from work of this Section.**

3.4 WARRANTY

- A. Product delivered shall be free of defects.**

END OF SECTION

SECTION 072200 – ROOF AND DECK INSULATION

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install rigid expanded polystyrene (EPS) insulation as indicated on Drawings and as specified herein, including:
 - 1. Rigid foam roof insulation for flat roof areas, where occurs.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 061000 - Rough Carpentry
- C. Section 133419 - Metal Building System

1.3 REFERENCES

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- B. ASTM C1289 – Standard Specification for Faced Rigid Cellular Polyisocyanurate Insulation Board.
- C. ASTM D 312 - Standard Specification for Asphalt Used in Roofing.
- D. ASTM E 108 - Standard Test Methods for Fire Tests of Roof Coverings.
- E. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- F. FM 4450 - Approval Standard - Class I Insulated Steel Roof Decks.
- G. FM 4470 - Approval Standard - Class I Roof Covers.
- H. LTTR – Long Term Thermal Resistance predicted by CAN/ULC-S770-03.

- I. UL 263 - Fire Tests of Building Construction and Materials.
- J. UL 790 – Standard Test Methods for Fire Tests of Roof Coverings.
- K. UL 1256 – Fire Test of Roof Deck Constructions.
- L. UL 1897 – Uplift Tests for Roof Covering Systems.

1.4 SUBMITTALS

- A. Comply with provisions of Section 013300, Submittal Procedures.
- B. Product Data: Submit manufacturer’s product data for specified products, including installation instructions.
- C. Shop Drawings: Submit shop drawings showing layout, profiles and product components.
- D. Samples:
 - 1. Submit 6 by 6 inch (152 by 152 mm) samples of each board type required.
 - 2. Submit samples of each fastener type required.
- E. Quality Assurance Submittals: Submit the following:
 - 1. Test Compliance: Summary of test compliance with specified performance characteristics and physical properties.
 - 2. Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria, and physical requirements. Manufacturer shall supply a hard copy product certificate showing Third Party Quality Control.
 - a. Physical properties in compliance with ASTM C578 for the type specified herein.
 - b. ICC ES Report.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- B. Delivery: Deliver insulation in packages labeled with material name, thermal value and product code
- C. Storage and Protection: Store materials unopened and above ground. Protect from moisture and sunlight prior to installation.

1. Products shall not be exposed to open flame or other ignition sources.
2. When stored outdoors, stack insulation on pallets above ground or roof deck and cover with tarpaulin or other suitable waterproof coverings. Slit or remove manufacturer's packaging before covering with waterproof covering.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Installer experienced in performing work of this section who has specialized in installation of work similar to that required for this project.
- B. Source Quality Assurance & Control: Each system component required shall be obtained from a single manufacturer.
- C. Field Quality Control:
 1. Manufacturer's Field Services: Upon District's request, provide manufacturer's field service consisting of periodic site visit for inspection of product.
 - a. Site Visits: number and duration of periodic site visits shall be as determined by the District.
- D. Regulatory Requirements: Installation must comply with the requirements of all applicable local, state and national jurisdictions.
 1. Approvals: EPS is made to industry recognized standards monitored by Underwriters Laboratories. Contact RControl for applicable compliance information.
- E. Pre-installation Meetings: At the request of the Architect and/or District, conduct a pre-installation meeting to verify project requirements, substrate conditions, installation instructions, and manufacturer's warranty requirements. Comply with Sections 013113, Project Coordination and 013119, Project Meetings.

1.7 WARRANTY

- A. Manufacturer's Warranty: Submit for District's acceptance the manufacturer's Standard Limited Warranty document.
 1. Manufacturer's warranty is in addition to, and not a limitation of, other rights District may have under Contract Documents.
 2. Warranty Period: Term as provided for in Manufacturer's Standard Limited Warranty.

- a. 20-year in-service, non-prorated R-Value warranty covering the long-term thermal performance of product.

2.0 PRODUCTS

2.1 MANUFACTURER

- A. Atlas Roofing Corporation, 2000 RiverEdge Pkwy, Suite 800, Atlanta, GA 30328. Ph. (770) 952-1442 Fax (770) 952-3170, or approved equal.
- B. Provide polyiso roof board insulation from a single manufacturer.

2.2 MATERIALS

- A. General: Materials herein must be compatible with all components of the roof assembly and the roofing membrane system.
 1. Substitutions to materials herein shall not be permitted.
- B. Tapered Foam Roof Insulation: Tapered ACFoam-IV: Closed-cell HCFC FREE “Green” polyisocyanurate foam core manufactured using ACUltra Hydrocarbon blowing agent and integrally laminated to heavy non-asphaltic fiber-reinforced felt facers; FM 1-90 wind uplift classification; compressive strength - 25 psi.
 1. ASTM C 1289, Type II, Glass I, Grade 3
 - a. Minimum thickness and Slope shall be determined in Shop Drawings as provided by Contractor, and as approved by Architect.
- C. Accessories: When required, roof tape for joint covering shall be fiborous glass or 15 lb. organic felt, minimum 4” width.

3.0 EXECUTION

3.1 EXAMINATION

- A. Prior to commencement of work of this Section, verify conditions of work of other Sections to ensure conditions are acceptable for product installation in accordance with manufacturer's instructions.
 1. Any adverse conditions shall be reported in writing. Do not proceed with installation until adverse conditions are corrected.

3.2 PREPARATION

- A. Preparation: Sweep and remove all loose particles and debris from the roof deck surface. Ensure that roof deck is sound, smooth and free of moisture.

- B. Verify that roof drains, scuppers, roof curbs, nailers, equipment supports, vents and other roof accessories are secured properly and installed in conformance with Contract Drawings and submittals.
- C. Verify that deck is structurally sound to support installers, materials and equipment without damaging or deforming work.
 - 1. Start of installation indicates installer accepts conditions of existing deck surfaces.

3.3 INSTALLATION

- A. Install in compliance with manufacturer's installation instructions using approved mechanical fasteners.
- B. Lay insulation with all joints tightly butted and attach per membrane manufacturer's specifications.
- C. All crickets and/or tapered insulation shall be installed per approved Shop Drawings.
- D. Follow the membrane manufacturer's specifications for fastening requirements for the insulation.
- E. Protect insulation from wind blow-off during all phases of construction. Temporary ballast and end-of-work-day water cut-offs must be used.

3.4 CLEANING AND PROTECTION

- A. Remove trash and construction debris from insulation surface prior to application of roofing membrane.
- B. Do not leave installed insulation exposed to weather. Cover and waterproof with completed roof system immediately after installation.
 - 1. Temporarily seal exposed insulation edges at the end of each day.
 - 2. Remove and replace installed insulation that has become wet or damaged with new insulation.
- C. Protect installed insulation and roof cover from traffic by use of protective covering materials during and after installation.

END OF SECTION

SECTION 072600 – SURFACE APPLIED VAPOR RETARDER

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install a surface applied vapor retarder as indicated on project Drawings and as specified herein.

1.2 RELATED SECTIONS

- A. Division 3 - Concrete
- B. Section 096500 - Resilient Flooring
- C. Section 096800 - Carpet Tile
- D. Section 099656 - Epoxy Coatings

1.3 REFERENCES

- A. ASTM F 1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
- B. ASTM F 2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
- C. ASTM E 1907 - Standard Practices for Determining Moisture-Related Acceptability of Concrete Floors to Receive Moisture-Sensitive Finishes
- D. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials
- E. ASTM D 4541 B - Pull-Off Strength of Coatings
- F. ASTM E 648-03 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems using a Radiant Heat Energy Source.

1.4 SUBMITTALS

- A. Submit under provisions of Section 013300.

- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.

- C. Manufacturer's written instruction for recommended maintenance practices.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.

- B. Installer Qualifications: Authorized representative of the manufacturer with minimum five years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened labeled packaging until ready for installation.

- B. Protect materials from exposure to moisture until ready for installation.

- C. Store materials in a dry, ventilated weathertight location.

1.7 PROJECT CONDITIONS

- A. Coordinate floor sealing installation with other trades.

- B. Maintain surfaces to be sealed and surrounding air temperature at not less than 50 degrees F.

- B. Exercise caution when temperatures exceed 90 degrees F.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Aquafin, Inc. 505 Blue Ball Rd., #160, Elkton, MD 1-800-394-1410, www.aquafin.com

- B. Substitutions: Not permitted.

2.2 MATERIALS

- A. Moisture vapor emission reduction control system (Concrete floor sealer): One-part system consisting of a two-component, 100% solids, solvent free, moisture tolerant, high density, low odor, chemically enhanced epoxy based product which must reduce vapor emissions (MVER) to 3 lbs/24 hours * 1000 SF or less and be compatible with floor finishes and adhesives approved by the manufacturer.

1. Characteristics:

a. Product:	VAPORTIGHT COAT® -SG3
b. Component-A and B:	Precise blend of clear and yellowish liquid
c. VOC content:	0 g/L
d. Bond/Adhesion: (ASTM D-4541)	>220 psi (>1.5 Mpa) at 28 day old concrete
e. Permeance: (ASTM E-96)	>0.5 perm (<3.1E ⁻⁰⁸ grams/Pa*s*m ²)
f. Alkaline Resistance: (ASTM D-1308)	up to pH 14
g. Vapor Reduction: (ASTM E-96)	up to 97%
h. Cured for installation on flooring:	12 hours at 73 degree F
i. pH on cured surface:	7
j. Average Critical Radiant Flux:	1.00 W/cm ² (ASTM E 648-03)

3.0 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until surfaces have been properly prepared.
- B. Assure that surfaces to be treated do not contain any kind of sealer or organic compounds.
- C. Anhydrous Calcium Chloride Testing as per ASTM F-1869 and/or Relative Humidity Testing as per ASTM F-2170: 1. Before installation of concrete floor sealer: use tests carried out by Architect/Engineer during study phase, and confirm by testing through installer or independent laboratory prior to installation of concrete floor sealer. 2. After installation of concrete floor sealer: not required by manufacturer of specified concrete floor sealer, unless to be carried out on a test application, specified during bid stage. 3. Alternatively or in addition to Calcium Chloride Testing use Relative Humidity tests carried out by

Architect/Engineer during study phase, and confirm by testing through installer or independent laboratory prior to installation of concrete floor sealer.

- D. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Protect adjacent surfaces not designated to receive concrete floor sealer.
- B. Substrate preparation:
1. Remove existing floor coverings, coatings and adhesives down to bare concrete, curing compounds, efflorescence, dust, grease, laitance, etc. with steel shot blasting, abrasive 072600-4 or 099656-4 (sand) blasting or grinding using a diamond cup blade (run in low gear to prevent polishing effect). Acid etching is not allowed.
 2. Assure that all slabs have surface profile ICRI CSP 3 - 5 (ICRI, Des Plaines, IL, Guideline No.03732.) for mechanical bond (i.e. medium grit sandpaper). Smooth surfaces are not acceptable, they must be shot blasted.
 3. Burn off reinforcing fibers and collect and vacuum remains.
 4. Repair defective areas such as honeycombs, cracks or other defects with a suitable repairing or manufacturer recommended mortar.
 5. Treat saw cut and expansion joints as per manufacturer's application guideline.
 6. Install cementitious underlayment, leveling mortars, flash patching, on top of surface applied concrete floor sealer.
 7. Do not apply floor sealer to unprotected surfaces or surfaces where water has accumulated (puddles).

3.3 INSTALLATION

- A. Mix concrete floor sealer material in proportions recommended by manufacturer.
- B. Apply concrete floor sealer material in quantities as per manufacturer's specifications and recommendations.
1. Apply in one coat at specified rate.
 2. Apply using non-shed synthetic roller or notched squeegee to the still moist substrate, and carefully scrub it into the pores with a long handled

scrub brush. Follow with a non-shed synthetic roller to achieve a uniform coverage.

- C. Where specified install leveling course as per manufacturer's specifications and recommendations.
- D. Where specified install floor covering as per manufacturer's specifications and recommendations.

- G. Note:
 - 1. Water based adhesives under VCT, sheet vinyl, linoleum, rubber backed carpet or other non-breathable flooring systems require a cementitious underlayment on top of the concrete floor sealer for their curing process. Consult adhesive manufacturer for recommended minimum thickness of cementitious underlayment.
 - 2. Pressure sensitive adhesives installed directly over concrete floor sealer require a longer "tack" time than listed on manufacturer's literature to prevent adhesive moisture entrapment.

3.4 CLEANING

- A. Clean floor and surrounding surfaces
- B. Remove temporary labels and visible markings.

3.5 PROTECTION

- A. Do not permit construction traffic on coated surface for a minimum of 12 hours after final application.
- B. Protect installed products until completion of project.

END OF SECTION

SECTION 072616 - BELOW-GRADE VAPOR BARRIER

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install below-grade vapor barrier where shown on the project Drawings and as specified herein.

1.2 RELATED SECTIONS

- A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. See Structural Drawings.

1.3 REFERENCES

- A. American Society for Testing & Materials (ASTM):
 - 1. ASTM D1709-04 : Impact Resistance of Plastic Film by the Free-Falling Dart Method.
 - 2. ASTM E96-95: Water Vapor Transmission of Materials.
 - 3. ASTM E154-99: Standard Test Method for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
 - 4. ASTM E1745-97: Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slab.
 - 5. ASTM E631: Terminology of Building Constructions
 - 6. ASTM E1643-98: Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
 - 7. ASTM F1249-90: Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.

8. ASTM D882-02: Tensile Properties of Thin Plastic Sheeting.

B. American Concrete Institute (ACI)

1. ACI302.1R-96 – Minimum Thickness (10-mils)

1.4 SUBMITTALS

A. Comply with provisions of Section 013300, Submittal Procedures.

B. Submit manufacturer's product data for each material specified herein, including test reports or manufacturer's certificates indicating materials comply with specified requirements.

C. Submit sample of each material specified herein.

1.5 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods necessary for proper performance of the work of this Section.

B. Cooperate as required in performance of the specified testing and inspecting.

1.6 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturer's recommendations for storage and handling of product.

2.0 PRODUCT

2.1 MANUFACTURER

A. Stego Industries LLC, San Clemente, CA, Tel: 949-257-4100, Toll Free: 877-464-7834, Fax: 949-257-4113, www.stegoindustries.com, or approved equal.

2.2 MATERIALS

A. Stego Wrap Vapor Barrier (underslab): multi-layer plastic extrusion with a proprietary formulation of prime, virgin, polyolefin resins - 15 Mil

1. Thickness: 15-mils

2. Roll Dimensions: 14 ft. x 140 ft.

3. Roll Weight: 140 lbs.

4. Permeance: .0084 perms, .0035 WVTR per ASTM F1249

- B. Other Materials: Provide other materials not specifically described herein but required for a complete and proper installation, as selected by the Contractor and subject to the approval of the Architect and the manufacturer of underslab vapor retarder.

3.0 EXECUTION

3.1 EXAMINATION OF SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed.
1. Correct conditions detrimental to timely and proper completion of the work.
 2. Do not proceed until satisfactory conditions are corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's instructions and recommended methods of installation, and in accordance with procedures outlined in ASTM E1643.
- B. After base for concrete has been leveled, compacted and tamped, install the vapor barrier over the base and compacted fill, with the longest dimension parallel to the direction of the pour of the concrete.
- C. All joints should be lapped 6 inches and sealed with tape. Seal penetrations.
- D. Screed pin(s) shall not be driven through vapor barrier.
- E. All penetrations must be sealed using a combination of Stego Wrap, Stego Tape and/or Stego Mastic.
- F. Product should be as clean and dry as possible before sealing with tape. Verify with manufacturer of underslab vapor barrier.

END OF SECTION

SECTION 076000 - FLASHING AND SHEET METAL

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install all sheet metal and all flashing, including items not specifically described in other Sections but required to prevent the penetration of water through the exterior shell of the building as shown on project Drawings, including:
 - 1. Gutters and Rainwater Leaders
 - 2. Stucco Reglets
 - 3. Roof penetrations
 - 4. Window and door flashing
 - 5. Miscellaneous sheet metal fabrications.
 - 6. Sealants associated with shop fabrication of sheet metal work.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Division 7 - Thermal and Moisture Protection: All Sections
- C. Section 081100, Metal Doors and Frames
- C. Section 099100, Painting
- D. Section 133419, Metal Building System

1.3 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):

1. AAMA 603.8 – Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum.
 2. AAMA 605.2 – Specification for High Performance Organic Coatings on Architectural Extrusions and Panels.
 3. AAMA 611 – Standards for Anodized Architectural Aluminum.
- B. American Society for Testing and Materials (ASTM):
1. ASTM A525 - Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
 2. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) for Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process.
 3. ASTM A792 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy Coated by the Hot-Dip Process.
 4. ASTM B209/209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
 5. ASTM B32 - Standard Specification for Solder Metal.
 6. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products
- C. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA):
1. Architectural Sheet Metal Manual, current edition.
- D. National Roofing Contractors Association (NRCA):
1. Roofing and Waterproofing Manual, current edition.

1.5 SUBMITTALS

- A. Comply with provisions of Section 013300, Submittal Procedures.
- B. Product Data: submit manufacturer's product information, including installation instructions, product specifications and standard details, including manufacturer's standard range of colors and finish options.
 1. Submit color chips for Architect's review and selection.
- C. Samples: submit the following for Architect's review and acceptance:

1. Gutter and downspout sample: 12" long, full section.
 2. Hanger brackets, braces, and stiffeners: one of each type.
 3. Fasteners: six of each type.
- D. Shop Drawings: submit Shop Drawings and installation details showing methods of installation, sections and details, flashings and all other accessories.
1. Shop Drawings must show interface with all related work of other trades and proposed identification of component parts and finishes.
 2. Submit large-scale Shop Drawings (minimum 3/4"=1'-0').
- E. Warranty: submit manufacturer's standard warranty information for review and acceptance. Warranty shall cover corrosion of metal components.
1. Installer's warranty shall cover fastener failure, water penetration at joints or failure to drain.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Comply with manufacturer's recommendations for storage and handling.
- B. Use all means necessary to protect flashing and sheet metal before, during, and after installation and to protect the installed work and materials of other trades.
- C. Stack materials to prevent twisting, bending and abrasion, and store in a manner that allows for proper ventilation.
- D. Slope materials and components to ensure proper drainage.
- E. Prevent contact with materials that may cause discoloration or staining.
- F. In the event of damage, immediately make all repairs and replacements necessary for the approval of the Architect at no additional cost to the City.

1.7 QUALITY ASSURANCE

- A. Qualifications of Manufacturer: Manufacturer shall specialize in manufacturing products specified in this Section.
- B. Qualifications of Installers:
 1. Installer shall be thoroughly experienced in the work of this Section, including all materials and methods required, and shall provide at least one person who shall be present at all times during the execution of work of this Section.

- a. This qualified person shall direct the entire flashing and sheet metal fabrication and installation and shall ensure materials are installed in accordance with all pertinent local codes and regulations, including SMACNA's Architectural Sheet Metal Manual, current edition at time of construction.

C. Field Measurements: Verify all field measurements prior to fabrication of materials.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. Fry Reglet Architectural Metals, www.fryreglet.com

2.2 MATERIALS

A. General: Where sheet metal is required and no material or gauge is indicated on the Drawings, furnish and install the highest quality commensurate with the referenced standards.

1. Galvanized Steel: G90 (Z275) zinc coating; 24 gauge thick steel, unless otherwise shown (ASTM A653/A653M).

2. Plain Aluminum Sheet: 3003 alloy, H-14 temper; 0.032" thick (ASTM B209/209M)

3. Lead: 2.5 lb/sq. ft. (ASTM B749)

4. Galvanized Iron:

- a. Sheet metal or iron shall be a standard brand of openhearth copperbearing steel, copper-molybdenum iron, or pure iron sheets.

5. Zinc Coating:

- a. All galvanized sheets shall have a zinc coating applied by hot dip process to all surfaces per ASTM A653.

- b. Zinc coating shall weigh not less than 1-1/4 ounces per square foot nor more than 1-1/2 ounces per square foot of surfaces covered and shall conform with ASTM A525.

2.3 UNDERLAYMENT MATERIALS

A. Felts: ASTM D 226, Type II (No. 30), asphalt saturated organic felt, non-perforated.

B. Slip Sheet: Rosin-sized paper, minimum 3lb/100 sq. ft.

2.4 ACCESSORIES

- A. Gutters: See Section 074113, Metal Roof Panels
 - 1. Type: Standard G style beveled box per SMACNA
 - 2. Size: see Drawings
 - 3. Gauge: 24 gauge
 - 4. Metal: same as roofing panels
- B. Self-Adhering Membrane: Self-adhering rubberized asphalt laminated to cross-laminated polyethylene film
- C. Primer: Zinc molybdate type.
- D. Protective Backing Paint: Zinc molybdate alkyd.
- E. Sealant: Type 4 sealant specified in Section 079000.
 - 1. At copings (flat lock seams): Butyl, Type 3 as specified in Section 079000.
 - 2. All other locations: Polyurethane, Type 1 as specified in Section 079000.
- F. Plastic Cement: Type I (ASTM D4586)
- G. Reglets: Surface mounted, galvanized steel.
- H. Solder: use type suitable for application and material being soldered (ASTM B32), 60 percent lead and 40 percent tin with low antimony as recommended by manufacturer.
- I. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
 - 1. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
 - 2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
 - 3. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
 - 4. Spikes and Ferrules: Same material as gutter; with spike and ferrule matching internal gutter width.
- J. Drawbands: Stainless-steel hose clamp; worm drive.

- K. All other materials not specifically described but required for a complete and proper installation of flashing and sheet metal shall be new, first quality of their respective kinds, and subject to the approval of the Architect.

2.4 FABRICATION

- A. Form all sheet metal accurately to the dimensions and shapes required, finishing all molded and broken surfaces with true, sharp, straight lines and angles, free from distortion or defects.
- B. Cleats shall be fabricated of the same material as sheet metal, interlocking with sheet.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside $\frac{1}{2}$ "; miter and seam corners.
- E. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F. Fabricate corners from one piece with minimum 18" long legs; solder for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward $\frac{1}{4}$ " and hemmed to form drip.
- H. Flashings shall allow toe to extend 2 inches over roofing. Return and brake edges.
- I. Seal all metal joints.

2.5 FINISHES

- A. Factory Finish Class 1 Natural Anodized Finish: Clear anodic coating (AAMA 611 [AA-MM12C22A41]) not less than 0.7 mils thick.
- B. Factory Finish Class 1 Color Anodized Finish: Integrally colored anodic coating (AAMA 611 [AA-MM12C22A42]) not less than 0.7 mils thick.
- C. Factory Finish Polyvinylidene Fluoride coating: Multiple coat, thermally cured, fluoropolymer system conforming to AAMA 605.2.
- D. Factory Finish Primer Coat: Finish concealed side of metal sheets with primer compatible with finish system, as recommended by finish system manufacturer.

3.0 EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection:

1. Prior to all work of this Section, carefully inspect the installed work of other trades and verify that all such work is complete to the point where this installation may properly commence.
2. Verify that flashing and sheet metal may be installed in accordance with the original design, the approved Shop Drawings, and the referenced standards.

B. Correction:

1. In the event of discrepancy, immediately notify the Architect.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been resolved.

3.2 INSTALLATION

A. General:

1. Install starter and edge strips and cleats before beginning installation.
2. Surface mounted reglets shall be installed to lines and levels indicated on drawings.
3. Concealed metal surfaces shall be painted with protective backing paint to minimum dry film thickness of 15 mil..

B. Expansion:

1. Form, fabricate, and install all sheet metal so as to adequately provide for expansion and contraction in the finished work.

C. Weatherproofing:

1. Finish watertight and weather tight where so required.
2. Make all lock seam work flat and true to line, and sweated full of solder.
3. All flat lock seams and lap seams, when soldered, shall be at least 1/2 inch wide.
4. Lap seams not soldered shall lap according to pitch but in no case less than three inches.
5. Make all flat and lap seams in direction of flow.

D. Joints:

1. Join parts with rivets or sheet metal screws where necessary for strength or stiffness.

2. Provide suitable watertight expansion joints for all runs of more than 40 feet except where closer spacing is indicated on the Drawings or required for proper installation

E. Nailing:

1. Where ever possible, secure metal by means of clips or cleats without nailing through the metal.
2. In general, space all nails, rivets, and screws not more than eight inches apart and, where exposed to the weather, use lead washers.
3. For nailing into wood, use barbed roofing nails 1-1/4 inches long by 11 gauge.
4. For nailing into concrete, use drilled plugholes and plugs.

F. Embedment:

1. Embed all metal in connection with roofs in a solid bed of caulking, using the materials and methods described in Section 079000, Sealants and Caulking.

G. Soldering:

1. General:

- a. Thoroughly clean and tin all joint materials prior to soldering.
- b. Perform all soldering slowly with a well heated copper in order to heat the seams thoroughly and to completely fill them with solder.
- c. Perform all soldering with a heavy soldering copper of blunt design, properly tinned for use.
- d. Make all exposed soldering on finished surfaces neat, full flowing, and smooth.

3.3 TESTS

- A. Upon request of the Architect, demonstrate by hose or standing water that all sheet metal is completely watertight.

3.4 CLEAN UP

- A. Upon completion, remove all debris resulting from work of this Section.

3.5 WARRANTY

- A. The products delivered shall be free of defects.
- B. Manufacturer's standard performance warranty, as available for specified installation and environmental conditions.

END OF SECTION

SECTION 079000 - SEALANTS AND CAULKING

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install all sealants and caulking where required as shown on project Drawings and as specified herein.
 - 1. Provide a positive barrier against the penetration of air and moisture at joints between items where caulking is essential to the continued integrity of the barrier.
 - 2. Such caulking will normally be performed under the work of various Sections but shall be performed in strict accordance with the provisions herein.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 068200 – Fiberglass Reinforced Plastic Panels
- C. Section 088100 - Glass and Glazing
- D. Division 9 - Finishes
- E. Division 22 - Mechanical
- F. Division 26 – Electrical
- G. Section 321313 - Concrete Paving

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM E90 & C919

2. ASTM C834, Type C and Type OP, Grade -18 degrees C.
3. ASTM C1193, Standard Guide for Use of Joint Sealants.
4. ASTM C1472, Standard Guide for Calculating Movement and Other Effects When Establishing Sealant Joint Width.

1.4 SUBMITTALS

- A. Comply with provisions of Section 013300, Submittal Procedures.
- B. Before work is started, a sample opening of each type of joint shall be caulked where directed. Samples shall show materials, workmanship, bond, and color or caulking material as selected for the work. The materials, workmanship, bond, and color of the caulking work throughout the project shall match that of the approved sample joints.
- C. Warranty: Include coverage for installed sealants and accessories failing to achieve watertight seal, exhibit loss of adhesion or cohesion, and sealants which do not cure.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Storage:
 1. Store all caulking materials and equipment under conditions recommended by its manufacturer.
 2. Do not use materials stored for a period of time exceeding the maximum recommended shelf-life of the material.
 3. Sealant must be stored in original unopened container between 50 and 80 degrees F.
- B. Protection:
 1. Use all means necessary to protect caulking materials before, during, and after installation and to protect the installed work and materials of other trades.
- C. Repairs:
 1. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the County.

1.6 QUALITY ASSURANCE

- A. Qualifications of Applicators:

1. Applicator of caulk and sealants shall be fully qualified with a minimum of five years' prior experience in similar work and who have been specially trained in the techniques of caulking and who are completely familiar with the written recommendations of the manufacturer of the material being used.
2. Indication of lack of skill on the part of caulking installers shall be sufficient grounds for the Architect to reject installed caulking and to require its immediate removal and complete recaulking at no additional cost to the County.

B. Qualification of Manufacturer(s):

1. All caulking and sealant materials shall be new stock, manufactured not more than six months prior to use in the project.
2. Whenever the materials are specified by the name of the manufacturer, it shall be taken as intended to mean and specify the materials described, or any other approved made equal thereto, for the purpose intended. the Architect shall be the sole judge as to such equality.
3. Where mixing is required, mix no more material than can be installed within four hours maximum and in amounts not to exceed 5-gallon-unit increments.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Provide materials that are low-emitting.

1. Materials shall meet the limits of the State of California DHS Standard Practice for the Testing of Volatile Organic Compounds or shall be identified by the following certification programs:
 - a. Greenguard Environmental Institute
 - b. Scientific Certification Systems
2. Provide cut sheet and MSDS showing VOC limits for each adhesive used in the building.
 - a. Adhesives must meet and/or exceed VOC limits of South Coast Air Quality Management District Rule #1168.
3. Provide cut sheet and MSDS showing VOC limits for each sealant used in the building.
 - a. All sealants used as filler must meet or exceed Bay Area Resources Board Re. 8, Rule 51.

- b. Limits on VOCs for sealants for architectural use are 250 grams/liter (different levels for roadways, roofing material installation, PVC welding, and other).
- c. Limits on VOCs for sealant primers for architectural-nonporous are 250 grams/liter; for architectural-porous are 775 grams/liter.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. ER Systems, Pacific Polymers
- B. DAP Products Inc.

2.2 MATERIALS

- A. General:
 - 1. All caulking and sealant materials, unless otherwise specifically approved by the Architect, shall be a single or double component, primerless, non-sagging type in neutral color or other color approved by the Architect where exposed to view, and shall be one of the following or an equal approval by the Architect.
- B. Joint Compound Sealant: ELASTO-THANE 230
 - 1. Composition: Polyurethane-based joint sealant.
 - 2. Basic Uses: For sealing and caulking all joints that are subject to contraction and expansion. Bonds to concrete.
 - 3. Limitations: Containers that have been opened must be used up within one or two days since it is a moisture-reactive material. It sets up when exposed to air. All surfaces must be completely free of foreign matter. (White color may discolor from exposure to U.V. and also from fluorescent light.)
 - 4. Sizes: Available in 5-gallon pails, 10.5 oz. cartridges and 20.3 oz. sausages
 - 5. Standards: Federal Specification TT-S-230c. Type II, Class A. ASTM C-920-87, Type S, Class 25, Use NT, M, and A.
- C. DAP - SIDEWINDER ADVANCED SIDING & WINDOW SEALANT
 - 1. Basic Uses: Sealant is designed to provide water and weather protection by airtight seal when used on interior and exterior surfaces. Sealant can be used

for caulking window and door frames, vinyl, steel, aluminum, plywood siding, drywall, baseboards, bathroom and kitchen fixtures, primed fiber cement siding, and conventional stucco.

- a. Siliconized Acrylic Sealant is useful as an acoustical sealant in construction of walls, windows, doors, ceilings, and floors to reduce sound transmission in wall partitions to maintain specified STC and OITC values.
- b. DAP – Gutter & flashing advanced -VOC Compliant exterior sealant
 - i. Exterior flashing finish color : grey

2. Limitations:

- a. Do not use for structural repairs.
- b. Not recommended for below grade or water immersion applications.
- c. Not to be used in applications where the surrounding materials will exceed sustained temperatures of 180 degrees F.
- d. Do not expose to water or rain for at least 24 hours after application.
- e. Application is recommended when temperature of air and surface is 50 degrees F or above for a 24 hour period.
- f. Do not apply if relative humidity is above 90%.
- g. Do not freeze.

3. Packaging & Sizes: Sealant is available in 10.1 fl. oz. plastic caulking cartridges and 5-gallon plastic pails.

4. Standards:

- a. Meets or exceeds the requirements of ASTM C834, Type C (clear) and Type OP (opaque colors), Grade -18 degrees C.
- b. Meets or exceeds the requirements of ASTM E90 and C919.

3.0 EXECUTION

3.1 CAULKING SCHEDULE

- A. Carefully study the Drawings and furnish and install the proper caulking at each point where called for on the Drawings plus at all other points where caulking is required to maintain the continued integrity of the watertight barrier.

3.2 SURFACE CONDITIONS

- A. Inspection:

- 1. Prior to all caulking, carefully inspect the surface to which caulking is to be applied and verify that they are clean, sound, and free from deleterious material which might adversely affect the bond.
- 2. Verify that caulking may be installed in accordance with the manufacturer's recommendations.

- B. Corrections:

- 1. Clean all surfaces as necessary in accordance with manufacturer's instructions.
- 2. In the event of discrepancy, immediately notify the Architect and do not proceed with installation of caulking in areas of discrepancy until all such discrepancies have been resolved.
 - a. Non-structural shrinkage cracks larger than 1/16" and up to 1/4" must be treated and repaired accordingly prior to sealant application.
- 3. Use of a suitable latex or oil-based primer prior to application of sealant may be appropriate and shall be applied in accordance with manufacturer's instructions and per the Architect's approval.

3.3 INSTALLATION

- A. Install caulking in strict accordance with the manufacturer's recommendations, taking care to produce beads of proper width and depth, to tool as recommended by the manufacturer, and to immediately remove all surplus caulking.

- B. Joint Design:

- 1. Suitable for all properly designed joints following accepted engineering practices.
- 2. Joint width must be a minimum of 4 times the anticipated movement.

- C. Surface Preparation:

1. All joints must be absolutely clean and all curing compounds, old caulks, grease, waterproofing compounds, etc., must be removed.
2. For non-porous surfaces such as glass, metal, etc., cleaning with M.E.K. or Toluene is recommended.
3. Polyethylene rod or polyurethane foam is recommended as a joint-filler and back-up 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. Some surfaces may require the Elasto-Thane Primer.
 - a. Backer rod must be installed when joint is larger than 3/8".

D. Application:

1. Apply by caulking gun, hand-pressure-type, or pour from container.
2. Bulk sealant can be applied by pumping equipment, trowel or putty knife.
3. Press firmly into joint to assure good contact to the sides of the joint.

3.4 CLEAN UP

- A. Upon completion, remove all debris resulting from work of this Section.

3.5 WARRANTY

- A. Product delivered shall be free of defects.
- B. All products proven to be defective in manufacture will be replaced at no cost to the County. Since the use of these products is beyond our control we cannot assume any risk or liability for results obtained, nor can we accept damages in excess of the purchase price of these products.

END OF SECTION

Division 8: Openings

SECTION 081100 – METAL DOORS, WINDOWS AND FRAMES

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
 - 1. Provision of fire rated and non-fire rated steel doors for interior and exterior locations.
 - 2. Provision of steel frames for interior and exterior doors.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 054000 – Cold Formed Metal Framing: Provision of metal framing.
- C. Section 055000 - Metal Fabrications: Provision of grout.
- D. Section 079000 – Sealants and Caulking: Provision of acoustical sealant
- E. Section 081416 - Flush Wood Doors: Provision of flush wood doors.
- F. Section 088000 – Glass and Glazing: Provision of glass and glazing.
- G. Section 099000 - Painting and Coating: For field painting primed doors and frames.
- H. Products Installed But Not Furnished Under This Section
 - 1. Section 087100 - Door Hardware: Furnishing of finish hardware.

1.3 REFERENCES

- A. ANSI - American National Standards Institute
 - 1. A224.1 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors, Windows and Frames.

- B. ASTM - American Society for Testing and Materials
 1. A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 2. A366 - Standard Specification for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
 3. A525 - Standard Specification for General Requirements for Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process.
 4. A526 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality.
 5. A568 - Standard Specification for General Requirements for Steel, Sheet, Carbon and High-Strength, Low Alloy, Hot-Rolled and Cold Rolled.
 6. A569 - Standard Specification for Steel, Carbon (0.15 Maximum, Percent) Hot-Rolled Sheet and Strip, Commercial Quality.
 7. A642 - Standard Specifications for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Drawing Quality, Special Killed.
 8. E90 - Test Method for Laboratory Measurement of Airborne-Sound Transmission Loss of Building Partitions.
 9. E152 - Test Methods for Fire Tests of Door Assemblies.
 10. E413 - Classification for Rating Sound Insulation.
- C. DHI - Door and Hardware Institute
 1. RL - Recommended Locations for Builder's Hardware on Standard Steel Doors and Frames.
- D. NFPA - National Fire Protection Association
 1. 80 - Fire Doors and Windows.
- E. SDI - Steel Door Institute
 1. 100 - Recommended Specifications Standard Steel Doors and Frames.
 2. 105 - Recommended Erection Instructions for Steel Frames.
 3. 112 - Galvanized Standard Steel Doors and Frames.
 4. 117 - Manufacturing Tolerances Standard Steel Doors and Frames.

F. UL - Underwriters Laboratories, Inc.

1.4 SUBMITTALS

- A. Product Data: Submit product data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles and finishes.
- B. Shop Drawings: Submit shop drawings showing fabrication and installation of standard steel doors and frames referenced to the Architect's door mark and hardware group. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
1. Provide schedule of doors and frames using same reference numbers for details and openings as those on the Contract Drawings.
 2. Indicate coordinate of glazing frames and stops with glass and glazing requirements.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements
1. Provide fire rated door assemblies that comply with NFPA 80, are identical to door and frame assemblies whose fire resistance characteristics have been determined in accordance with ASTM E152 and which are labeled and listed by UL or Intertek Testing Agency.
 2. Oversized Fire Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide manufacturer's certification that doors conform to standard construction requirements of tested and labeled doors for rated door assemblies except for size.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Acceptance at Site
1. Deliver doors, windows and frames cardboard-wrapped or crated to provide protection during transit and job storage.
 2. Inspect doors, windows and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to the Architect; otherwise, remove and replace damaged items as directed.

- B. Storage and Protection: Store doors windows, and frames at building site under cover.
Place units on minimum 4 inches high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately.
Provide 1/4-inch spaces between stacked doors to promote air circulation.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Republic Builders Products; Steelcraft Manufacturing Co., or equal.

2.2 MATERIALS

- A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A569 and ASTM A568.
- B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A366 and ASTM A568.
- C. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A526, or drawing quality, ASTM A642, hot dipped galvanized in accordance with ASTM A525 with A60 or G60 coating designation, mil phosphatized.
- D. Supports and Anchors: Fabricate of not less than 18 gauge sheet steel; galvanized where used with galvanized frames.
- E. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built in at exterior walls, hot-dip galvanize in compliance with ASTM A153, Class C or D as applicable.
- F. Shop Applied Paint: Apply after fabrication.
 - 1. Primer: Rust-inhibitive enamel or paint, either air-drying or baking, suitable as a base for specified finish paints complying with ANSI A224.1.
- G. Finish: As specified in Section 099000.

2.3 DOORS

- A. Provide metal doors of SDI grades and models specified as indicated on the Drawings or schedules:
 - 1. Interior Doors: SD1100, Grade HI, Model 1, minimum 18 gauge

cold-rolled sheet steel faces.

2. Interior Windows: SD1100, Grade HI, Model 1, minimum 18 gauge cold-rolled sheet steel faces.
3. Exterior Doors: SD1100, Grade III, extra heavy-duty, Model 1, minimum 16 gauge galvanized steel faces.
4. Exterior Windows: SD1100, Grade III, extra heavy-duty, Model 1, minimum 16 gauge galvanized steel faces.
3. Interior Door Louvers; Provide sightproof stationary louvers for interior doors where indicated, constructed of inverted V-shaped or Y-shaped blades formed of 24 gauge cold-rolled steel set into minimum 20 gauge steel frame.
4. Exterior Door Louvers: Provide rainproof louvers, heavy duty 16 gauge with insect screen, with minimum 50 percent free area.

B. Door Cores

1. Core Stiffeners: Vertical steel stiffeners or steel channel grid.
2. Core Filler
 - a. Sound deadening mineral composition, incombustible, moisture resistant, chemically inert in accordance with reviewed manufacturer's recommendations.
 - b. Fire Resistive; Labeled door core material shall conform to requirements of labeling authority.

C. Frames

1. Provide metal frames for doors and windows of types and styles as indicated on the Drawings and schedules. Conceal fastenings, unless otherwise indicated.
 - a. Interior: Fabricate fully welded frames of minimum 18 gauge cold-rolled steel,
 - b. Exterior. Fabricate fully welded frames of minimum 14 gauge hot-rolled steel and galvanized.
 - c. Interior Acoustic Frames: Fabricate fully welded frames of minimum 16 gauge cold rolled steel, padded with mineral wool insulation.

2. Door Silencers: Except on weatherstripped and smoke gasketed frames, drill stops to receive 3 silencers on strike jambs of single door frames and 2 silencers on heads of double door frames,
- D. Hardware: As specified in Section 087100.
- E. Glass and Glazing: As specified in Section 088100.
- F. Acoustical Sealant; As specified in Section 079000.

2.4 FABRICATION

- A. Fabricate steel door, window or frame units to be rigid, neat in appearance and free from defects, warp or buckle. Wherever practicable, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site. Comply with SD1100 requirements.
 1. Internal Construction: Manufacturer's standard vertical steel stiffeners or unitized steel grid with internal sound deadener on inside of face sheets in accordance with SDI standards.
 2. Clearances: Not more than 1/8-inch at jambs and heads except between non-fire rated pairs of doors not more than 1/4-inch. Not more than 3/4-inch at bottom.
- B. Fabricate exposed faces of doors, windows and panels, including stiles and rails of nonflush units, from only cold-rolled steel.
- C. Tolerances: Comply with SD1117.
- D. Fabricate frames, concealed stiffeners, reinforcement, edge channels, louvers and moldings from either cold-rolled or hot-rolled steel.
- E. Fabricate exterior doors, panels and frames from galvanized sheet steel in accordance with SD1112. Close top and bottom edges of exterior doors as integral part of door construction or by addition of minimum 14 gauge inverted galvanized steel channels.
- F. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.
- G. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware in accordance with final Door Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 Series Specifications for door and frame preparation for hardware.
- H. Reinforce doors and frames to receive surface applied hardware. Drilling and

tapping for surface applied hardware may be done at Project site.

- I. Locate hardware as indicated on final shop drawings or, if not indicated, in accordance with DHI RL.
- J. Shop Painting: Clean, treat and paint exposed surfaces of steel door and frame units, including galvanized surfaces.
 - 1. Clean steel surfaces of mill scale, rust, oil, grease, dirt and other foreign materials before application of paint.
 - 2. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint.
- K. Glazing Stops: Minimum 20 gauge steel.
 - 1. Provide non-removable stops on outside of exterior doors and on secure side of interior doors for glass, louvers and other panels in doors.
 - 2. Provide screw applied removable glazing beads on inside of glass, louvers, and other panels in doors.

2.5 FINISHES

- A. Finish Painting: As specified in Section 099100.

3.0 EXECUTION

3.1 INSTALLATION

- A. General: Install steel doors, windows, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.
- B. Placing Frames: Comply with provisions of SD1105, unless otherwise indicated.
 - 1. Place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
 - 2. Install fire rated frames in accordance with NFPA Standard No. 80.
 - 3. In metal stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In closed steel stud partitions, attach wall anchors to studs with screws.

4. Pack acoustic door frames with mineral wool.
- C. Door and Window Installation: Fit hollow metal doors and windows accurately in frames, within clearances specified in SD1100.
 1. Install fire rated doors with clearances as specified in NFPA Standard No. 80.
- 3.2 ADJUST AND CLEAN UP
- A. Prime Coat Touch-Up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
 - B. Final Adjustments: Check and readjust operating hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION

SECTION 081117 – PREFINISHED STEEL DOORS FRAMES

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
 - 1. Knocked down, site assembled prefinished steel door frames.
 - 2. Knocked down, site assembled sidelight, borrowed light, transom, and fullbound access door frames

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 081100 - Metal Doors, Windows and Frames
- C. Section 081416 - Flush Wood Doors
- D. Section 087100 - Door Hardware
- E. Section 088100 – Glass and Glazing
- F. Section 088000 - Glazing: Provision of glass and glazing.
- G. Section 099100 - Painting

1.3 REFERENCES

- A. ASTM A653 – Standard for hot dipped galvanized steel material.
- B. UBC 7-2-97, UBC 7-4-97 Positive Pressure Fire Test Certification.
- C. UL 10B Fire test of Door Assemblies and UL10C Standard for Positive Pressure Fire Tests of Door Assemblies.
- D. NFPA 80 - Fire Doors and Windows (Latest Edition)

- E. NFPA-101 - Life Safety Codes (Latest Edition)
- F. ASTM D2197 - Standard Test Method for Adhesion of Organic Coatings by Scrape Adhesion.
- G. ASTM D2247 - Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
- H. ASTM D2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
- I. ASTM D3361 - Standard Practice for Unfiltered Open-Flame Carbon-Arc exposures of Paint and Related Coatings.
- J. ASTM B117 – Standard test for salt spray testing

1.4 SUBMITTALS

- A. Product Data: Submit product data for each type of door and frame specified, gauge, configuration, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles and finishes.
- B. Shop Drawings: Submit shop drawings showing fabrication and installation of standard steel doors and frames referenced to the Architect's door mark and hardware group. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
 - 1. Provide schedule of doors and frames using same reference numbers for details and openings as those on the Contract Drawings.
 - 2. Indicate coordinate of glazing frames and stops with glass and glazing requirements.
- C. Manufacturer's Certificate of Warranty: Provide manufacturer's standard warranty certificate stating material is warranted for a period of one year from date of building occupancy.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements
 - 1. Provide fire rated door assemblies that comply with NFPA 80, are identical to door and frame assemblies whose fire resistance characteristics have been determined in accordance with ASTM E152 and which are labeled and listed by UL or Intertek Testing Agency.
 - 2. Oversized Fire Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide manufacturer's certification that doors

conform to standard construction requirements of tested and labeled doors for rated door assemblies except for size.

B. Quality Standards

1. Material free from defects in material and openings in pre-engineering systems.
2. Proven durability of factory finishes allowing for bending and shaping of material after finish is applied.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Acceptance at Site:

1. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage.
2. Inspect doors and frames upon delivery for damage. Minor damages may be repaired provided refinished items are equal in all respects to new work and acceptable to the Architect; otherwise, remove and replace damaged items as directed.

B. Storage and Protection: Store doors and frames at building site under cover. Place units on minimum 4 inches high wood blocking. Avoid use of non-vented plastic or canvas shelters which could create humidity chamber. If cardboard wrapper on door becomes wet, remove carton immediately. Provide 1/4-inch spaces between stacked doors to promote air circulation.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Timely Industries, A Division of SDS Industries, Inc., 1024 Norris Avenue, Pacoima, CA 91331, Phone 800-247-6242, www.timelyframes.com, or equal.
- B. Frames: Provide all interior frames for the project by single manufacturer.

2.2 FRAMES

- A. Frame Material: Hot dipped galvanized steel, for interior frames in normal atmospheric exposures.
- B. Frame Material: Hot dipped galvanized steel for all frames used in the following locations:
1. Interior Locations.
 2. Public Restrooms.

- C. Frame Throat Opening: As shown on plan details to suit finished wall thickness.
- D. Fire rated frames and Office Entry frames to be kerf formed into frame profile with factory installed, pre-mitered smoke/sound control gasket
- E. Frame Profile - Unequal Rabbet profile, standard with manufacturer
 - 1. "S" Series, 0.9 mm (20 Gauge) thick, interior office spaces
 - 2. "C" Series, 1.2 mm (18 Gauge) thick, other areas, non standard jamb depths
 - 3. "CK" Series, 1.2 mm (18 Gauge) thick, with kerf for door seal/gasket
 - 4. "E" Series 0.9 mm (20 Gauge) thick
 - a. #430 Bright Polished Stainless Steel
 - b. #304 Brushed Stainless Steel
 - c. Polished Brass, Brass Base metal (Cannot be fire rated)
 - d. Polished Brass, Steel Base metal (Can be fire rated)
- F. Casings
 - 1. Provide steel casings formed to be applied to heat treated clips on frame face after frame is anchored to wall
 - 2. Standard Steel - TA-8 with 6 mm (1/4 inch) reveal, on steel, stainless steel, and/or brass frames. Fit factory assembled units with MiterGard corner alignment clips.

2.3 FRAME REINFORCEMENT AND ACCESSORIES

- A. Provide reinforcements shipped loose to project site for hardware application.
 - 1. TA-10 - Regular arm closers, casing mounted coordinators
 - 2. TA-12 - Parallel arm closers, Rim Exit device strikes, other stop mounted surface hardware
 - 3. TA-47 – For CK frame, Parallel arm closers, Rim Exit device strikes, other stop mounted surface hardware
 - 4. TA-25 - Double acting spring hinges, continuous hinges, other surface mounted hardware on door rabbet or cased opening frame
 - 5. Provide hinge reinforcement (TA-11) of 14 Gauge steel pierced to create depth of thread for hinge screws equal to or exceeding 7 Gauge steel.
- B. Weatherstrip/Smoke Gasket: TA-46 (QDS500) 90 minute rated gasket for kerfed frames. All pieces factory mitered to assure perfect corner alignment.
 - 1. Color: Grey.
- C. Silencers: TA-5 vinyl, 2 per frame, clear stick-on type. Silencers not required on kerfed frames or frames scheduled to receive stop mounted gasket or weatherstrip
- D. Glass Stops: TA-14 removable rolled steel, shape, butted ends. Pre-punch and countersink for flat head tek screws.

- E. Adjustable strikes: Emboss frames for TA-1 strike for cylindrical lock. Provide TA-1 strike in finish compatible with hardware finish. (ANSI 2 ¾" T strike supplied with cylindrical lock cannot be used with standard frame because of unique strike location and screw piercing method)
- F. Prepare frames for ASA 4-7/8" strikes where required. Provide minimum ¼" depth of threads in factory tapped screw holes
- G. Installation fasteners (Provided by others):
 - 1. Interior Frames: #6 Drywall type in length sufficient to penetrate studs or structure at least ½".

2.4 FABRICATION

- A. Openings for single swing, pair, borrowed light and sidelight frames to be pre-cut, notched and fabricated at the manufacturer's facility. For fire rated openings, provide kerf at stop for installation of smoke gasket or weatherstrip.
- B. Provide minimum 14 Gauge hinge reinforcement plate tapped for machine screws supplied with hinges. Hinge plate to be mechanically attached to hinge emboss on frame.
- C. Casing Clips: Fabricate frames with factory applied, heat treated clips to ensure no deflection in the clip upon application or removal of casing.
- D. Provide notches, tabs and/or stops for positive alignment of frame parts at all corners.
- E. Mullions to be notched as required to provide tight joints.
- F. Provide manufacturer's standard mullion brackets for positive connection of frame and mullion parts.
- G. Provide manufacturer's standard steel glass stop pre-cut to exact length. Fire rated glazed openings to have hole for installation screw within 2" of each end of stop piece.
- H. Provide insert channel full width of borrowed lights installed on finish floor. Provide full width head channel for ceiling height units.
- I. Transom bars to be fixed type with compatible profiles to jamb and head.
- J. Attach approved mylar label to each fire-rated frame indicating fire rating details.
- K. Factory install TA-46 smoke gasket on all prefinished, CK series frames. Install with factory mitered corners to ensure adequate seal and pleasing appearance

2.5 FINISHES

- A. Frame Units: Prefinished with factory applied impact resistant, polyurethane baked enamel finish.
- B. Frames for high humidity areas to be hot dipped galvanized.
- C. Casing Finishes

1. Steel: Prefinished with factory applied impact resistant, polyurethane baked enamel finish.

D. Colors:

1. Colors: As specified in Section 099100.

3.0 EXECUTION

3.1 INSTALLATION

- A. General: Install steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as herein specified.
 - 1. Verify acceptability of existing conditions before starting work.
 - 2. Verify that opening sizes and wall thicknesses are within specified tolerances. Verify that all finished walls are in plane to ensure proper door alignment.
- B. Install frames in accordance with manufacturer's requirements.
- C. Anchor frames with screws located at every casing clip or every 11" as shown on manufacturer's instructions. Field verify quantity and location of fasteners prior to installing casing.
- D. Install prefinished frames near end of the project after wall painting and wall coverings are applied.
- E. Install frames using qualified installers familiar with installation of prefinished drywall frames.
- F. Coordinate installation of glass and glazing in glazed units.
- G. Coordinate installation of frames with installation of hardware specified in Section 087100 and doors in Section 081100.
- H. Touch-up blemishes on finished frames with factory prepared touch up paint.

3.2 ADJUST AND CLEAN UP

- A. Prime Coat Touch-Up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.
- B. Final Adjustments: Check and readjust operating hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

END OF SECTION

SECTION 081416 – FLUSH WOOD DOORS

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provision of fire rated and non-fire rated flush solid core doors with wood veneer faces as shown on project Drawings and as specified herein.

1.2 RELATED SECTION

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 081100 - Metal Doors, Windows and Frames: Provision of steel door frames.
- C. Section 088100 - Glazing: Provision of glass and glazing.
- D. Products Installed But Not Furnished Under This Section
 - 1. Section 087100 - Door Hardware: Furnishing of finish hardware.

1.3 REFERENCES

- A. ASTM - American Society for Testing and Materials
 - 1. E152 - Test Methods for Fire Tests of Door Assemblies.
- B. AWI - American Woodwork Institute
- C. DHI - Door and Hardware Institute
 - 1. A115-W - Wood Door Preparation Standards, a set containing A115-W1 - A115-W9.

2. WDHS-3 - Recommended Hardware Locations for Wood Flush Doors.
- D. NFPA - National Fire Protection Association
 1. 80 - Fire Doors and Windows.
- E. NWWDA - National Wood Window and Door Association
 1. I.S.1-A - Architectural Wood Flush Doors.
- F. UL - Underwriters Laboratory, Inc.

1.4 SUBMITTALS

- A. Product Data: Submit product data for each type of door, including details of core and edge construction, trim for openings and louvers, and factory-finishing specifications.
- B. Shop Drawings: Submit shop drawings indicating location and size of each door referenced to the Architect's door mark and hardware group, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, requirements for factory finishing and other pertinent data.
 1. For factory-machined doors, indicate dimensions and locations of cutouts for locksets and other cutouts adjacent to light and louver openings.
 2. Samples for verification in the form and size indicated below;
 - a. Corner sections of doors approximately 12 inches square with door faces and edgings and final finish representing the typical range of color and grain for each species of veneer and solid lumber required.
 - b. Louvers consisting of blade and frame, 6 inches long, for each material and finish specified.
 - c. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.5 QUALITY ASSURANCE

- A. Regulatory Requirements
 1. Fire Rated Wood Doors: Provide wood doors that comply with NFPA

80; are identical in materials and construction to units tested in door and frame assemblies per ASTM E152; and are labeled and listed by UL, Intertek Testing Agency or another testing and inspection agency acceptable to authorities having jurisdiction.

B. Quality Standard

1. NWWDA Quality Standard: I.S.1-A.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Packing and Shipping: Identify each door with individual opening numbers as designated on shop drawings, using temporary, removable or concealed markings. Use the Architect's door numbering system.
- B. Storage and Protection: Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's instructions.

1.7 PROJECT CONDITIONS

- A. Environmental Requirements: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.8 WARRANTY

- A. General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4-inch in a 42 inch by 84 inch section or that show telegraphing of core construction in face veneers exceeding 0.01-inch in a 3 inch span, or do not conform to tolerance limitations of referenced quality standards.
1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors where defect was not apparent prior to hanging.
 2. Warranty shall be in effect during the following period of time after

date of Substantial Completion, Beneficial Occupancy or Notice of Completion, whichever is earlier.

a. Solid Core Interior Doors: Life of installation.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Algoma Hardwoods, Inc.; Eggers Industries, Architectural Door Division; Marshfield DoorSystems, Inc., or equal.

2.2 MATERIALS

A. Interior Solid Core Doors for Transparent Finish

1. Faces: White maple, quarter awn, book matched.
2. Grade: Premium.
3. Construction: 5 plies.
4. Thickness: 1-3/4 inch.
5. Core: Particleboard core.
6. Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering.

B. Interior Fire Rated Solid Core Doors

1. Faces and Grade: Provide faces and grade to match non-fire rated doors in same area of building, unless otherwise indicated.
2. Construction: Manufacturer's standard core construction as required to provide fire-resistance rating indicated.
3. Blocking: Provide composite blocking designed to maintain fire resistance of door but with improved screw-holding capability of same thickness as core and with minimum dimensions as follows:
 - a. 5 inch top rail blocking.
 - b. 5 inch bottom rail blocking.
 - c. 5 inch by 18 inch lock blocks.
 - d. 5 inch midrail blocking.

4. Edge Construction; Provide manufacturer's standard laminated edge construction for improved screw-holding capability and split resistance as compared to edges composed of a single layer of treated lumber.
 5. Pairs: Furnish formed steel edges and astragals for pairs of fire rated doors, unless otherwise indicated.
- D. Metal Louvers: Size, type, and profile shown and fabricated from galvanized steel, 0.0396-inch thick; hot dip, zinc coated and factory primed for paint finish.
- E. Hardware: As specified in Section 087100.
- F. Glass: As specified in Section 088100.

2.3 FABRICATION

- A. Fabricate flush wood doors to comply with the following requirements:
1. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI WDHS-3. Comply with final hardware schedules, door frame shop drawings, DHI A115-W series standards, and hardware templates.
 - a. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory machining.
- B. Openings: Factory cut and trim openings through doors to comply with applicable requirements of referenced standards for kinds of doors required.
1. Light Openings: Trim openings with moldings of square profile matching hardwood.
 2. Louvers: Factory install louvers in prepared openings.

2.4 SHOP PRIMING

- A. Doors for Transparent Finish: Shop seal faces and edges of doors for transparent finish with stain, other required pretreatments and finish coats.
- B. Doors for Opaque Finish: Shop seal faces and edges of doors for opaque finish with primer compatible with finish paint specified in Section 09900.

2.5 FINISHES

A. Transparent Finish

1. Grade: Premium.
2. Finish: AWI System TR-2 catalyzed lacquer.
3. Staining: Match approved sample for color.
4. Effect: Open grain finish.
5. Sheen: Satin.

3.0 EXECUTION

3.1 EXAMINATION

- A. Examine installed door frames prior to hanging door
1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
 2. Reject doors with defects.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: See Section 087100.
- B. Manufacturer's Instructions: Install wood doors to comply with manufacturer's instructions and referenced quality standard and as indicated.
1. Install fire rated doors in corresponding fire rated frames according to requirements of NFPA 80.
- C. Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire rated doors. Seal cut surfaces after fitting.
1. Fitting Clearances for Non-Fire Rated Doors: Provide 1/8-inch at jambs and heads; 1/16-inch per leaf at meeting stiles for pairs of doors, and 1/8-inch from bottom of door to top of decorative floor finish or covering.

Where threshold is shown or scheduled, provide 1/4-inch clearance from bottom of door to top of threshold.

2. Fitting Clearances for Fire Rated Doors: Comply with NFPA 80.
3. Bevel non-fire rated doors 1/8-inch in 2 inches at lock and hinge edges.
4. Bevel fire rated doors 1/8-inch in 2 inches on lock edge; trim stiles and rails only to extent permitted by labeling agency.

3.3 ADJUSTING AND PROTECTION

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Refinish or replace doors damaged during installation.
- C. Protect doors as recommended by door manufacturer to ensure that wood doors will be without damage or deterioration at the time of Substantial Completion.

END OF SECTION

SECTION 083300 – OVERHEAD COILING GRILLE

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install an electric operated overhead coiling grille complete with reinforcing, fasteners, anchors, and attachment devices, including all related accessories necessary to complete work.
- D. Products that may be supplied, but are not installed under this section:
 - 1. Control Station

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 055000 - Metal Fabrications (Door opening jamb and head members)
- C. Section 087100 – Door Hardware (Masterkeyed cylinder)
- D. Division 26 - Electrical

1.3 SYSTEM DESCRIPTION

- A. Design Requirements:
 - 1. Cycle Life:
 - a. Design Grilles of standard construction to a standard maximum of 10 cycles per day and an overall maximum of 50,000 operating cycles for the life of the grille.

1.4 SUBMITTALS

- A. Comply with provisions of Section 013300, Submittal Procedures.
- B. Product Data:

1. Submit manufacturer's descriptive literature and product specifications.
2. Include information for factory finishes, hardware, accessories, and other required components.

C. Shop Drawings:

1. Submit shop drawings covering fabrication, installation and finish of specified systems.
2. Include following:
 - a. Fully dimensioned plans and elevations with detail coordination keys.
 - b. Include special conditions not detailed in Product Data. Show interface with adjacent work.
3. Provide detailed drawings of:
 - a. Joint connections for framing systems.
 - b. Anchorage.
 - c. System reinforcements.
 - d. Sealant requirements.

D. Samples:

1. Submit Manufacturer's standard samples indicating quality of finish.

E. Test Reports:

1. Standard Systems: Submit certified copies of previous test reports substantiating performance of system in lieu of retesting. Include other supportive data as necessary.

F. Qualification Data:

1. Submit installer qualifications verifying years of experience.

G. Manufacturer's Instructions: Submit manufacturer's printed installation instructions.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Protect finished surfaces as necessary to prevent damage.

- B. Do not use adhesive papers or sprayed coatings that become firmly bonded when exposed to sun.
- C. Do not leave coating residue on any surfaces.
- E. Replace damaged units.
- F. Follow manufacturer's instructions.

1.7 QUALITY ASSURANCE

- A. Single Source Responsibility:
 - 1. To ensure quality of appearance and performance, obtain materials for systems from either a single manufacturer or from manufacturer approved by systems manufacturer.
- B. Installer Qualifications: Manufacturer's approval.
- C. Manufacturer Qualifications: ISO 9001:2015 registered and a minimum of five years experience in producing grilles of the type specified.
- D. Perform Work in accordance with manufacturer's written instructions.

1.8 WARRANTY

- A. Provide written warranty in form acceptable to County jointly signed by manufacturer, installer and Contractor warranting work to be free from defective materials, defective workmanship, and agreeing to replace components which fail within 1 year from date of Substantial Completion.
- B. Standard Warranty: Two years from date of shipment against defects in material and workmanship.
- C. Maintenance: Submit for owner's consideration and acceptance of a maintenance service agreement for installed products.

2.0 PRODUCTS

2.1 MANUFACTURER

- A. Cookson – 1901 South Litchfield Rd, Goodyear, AZ 85338. Telephone: (800) 294-4358. Underwriters Laboratories, Inc. (UL), ISO 9001:2015 Registered.

2.2 MATERIALS

- A. Curtain
 - 1. Configuration – Straight Pattern:

- a. Horizontal Rods: Solid 5/16" diameter, 5056 H32 aluminum alloy.
 - b. Vertical Chains: Grommets aluminum links, 3/4" wide, positioned by E-rings on centers. Horizontal bars provided with double E-rings on both sides of end chains to retain curtain in guides.
2. Finish: Aluminum, mill finish.
- B. Bottom Bar:
1. Configuration: 2 x 3 1/2" extruded aluminum tubular section reinforced with 3 x 2 x 3/16 inch aluminum angle(s).
 2. Finish: Extruded aluminum, mill finish.
- C. Guides:
1. Finish: Extruded aluminum, mill finish.
- D. Counterbalance Shaft Assembly:
1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot (2.5 mm per meter) of width.
 2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs (110 N). Provide wheel for applying and adjusting spring torque.
- E. Brackets: Fabricated from steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.
1. Finish: Powder coated Gray
- G. Hood and Fascia: 0.040 inch (1.016 mm) aluminum with reinforced top and bottom edges. Provide minimum 1/4 inch (6.35 mm) steel intermediate support brackets as required to prevent excessive sag.
1. Finish: Aluminum, mill finish.

2.3 OPERATION

- A. Motor – standard use – Model MG (Industrial Duty Gear Head) Operator:
1. Rated for a maximum of 20 cycles per hour (not to be used for consecutive hours).

2. cULus listed (complies with UL requirements in The United States and Canada)
3. Totally Enclosed Non Ventilated gear head operator(s)
4. Provided with electric motor and factory pre-wired motor control terminals as well as maintenance free solenoid actuated brake.
5. High starting torque, industrial type, protected against overload with an auto-reset thermal sensing device.
6. Heavy-duty primary speed reduction, lubricated gears with mechanical braking to hold the door in any position.
7. Operator drive and door driven sprockets provided with #50 roller chain.
8. Integral Motor Mounted Interlock system will prevent damage to door and operator due to use of mechanical door locking devices.
9. Operator capable of driving the door at a speed of 6 to 9 inches per second (20 to 23 cm/sec).
10. Fully adjustable, driven linear screw type cam limit switch mechanism synchronizes the operator with the door.

B. Motor Control Options:

1. 1 – Three button push button station ‘OPEN-CLOSE-STOP’ flush mounted.

2.4 ACCESSORIES

- A. Locking: Cylinder Lock both jambs operable from secured side.
- B. Operator and Bracket Mechanism Cover: Provide 0.040 inch (1.016 mm) aluminum sheet metal cover to enclose exposed moving operating components at coil area of unit. Finish to match door hood.

3.0 EXECUTION

3.1 EXAMINATION

- A. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings.
- B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.
- C. Commencement of work by installer is acceptance of substrate.

3.2 INSTALLATION

- A. General: Install grille and operating equipment with necessary hardware, anchors, inserts, hangers and supports.
- B. Follow manufacturer's installation instructions.

3.3 ADJUSTING

- A. Following completion of installation, including related work by others, lubricate, test, and adjust grilles for ease of operation, free from warp, twist, or distortion.

3.4 CLEANING

- A. Clean surfaces soiled by work as recommended by manufacturer.
- B. Remove surplus materials and debris from the site.

3.5 DEMONSTRATION

- A. Demonstrate proper operation to Owner's Representative.
- B. Instruct Owner's Representative in maintenance procedures.

END OF SECTION

SECTION 085169 – GATE HARDWARE

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
 - 1. “Hardware groups” have been assigned to the various gates required for this work, as indicated in the Gate Schedule on the Drawings. The hardware groups are described in detail in the “Gate Hardware Schedule,” Section 3.2 A and B of this Section.
 - 2. Unless otherwise approved by the Architect, furnish all finish hardware described in the Gate Hardware Schedule and all other finish hardware not described but required for a complete and operable facility.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to the drawings and project manual.
- B. Section 323119 – Decorative Metal Fences and Gates
- C. Section 323113 - Chainlink Fences and Gates

1.3 QUALITY ASSURANCE

- A. Qualifications of Supplier:
 - 1. The finish hardware supplier shall have an AHC member of the American Society of Hardware Consultants who shall be made available for consultation at no additional cost to the District during construction.
 - 2. The AHC shall be present at completion of the work and shall check the installation of finish hardware and shall report to the Architect all obvious misapplication of finish hardware.

1.4 SUBMITTALS

- A. Comply with pertinent provisions of these Contract Documents.

B. Materials List:

1. Within 15 days after award of Contract, and before any finish hardware is ordered or purchased for this work, submit to the Architect for his approval a complete list of all finish hardware proposed to be furnished for this work, giving manufacturer's name and catalog number for each item.
2. This shall in no way be construed as permitting substitution of items for the items specified.

1.5 DELIVERY, STORAGE AND PRODUCT HANDLING

A. Delivery:

1. Deliver all finish hardware to the job site with all labels intact and legible.

B. Packaging:

1. Furnish all finish hardware with each unit marked or numbered in accordance with the Hardware schedule.
2. Pack each item complete with all necessary pieces and fasteners.
3. Properly wrap and cushion each item to prevent scratches during delivery and storage.

C. Protection:

1. Use all means necessary to protect materials before, during and after installation and to protect the installed work and materials of other trades.

D. Replacement:

1. In the event of damage, immediately make all repairs and replacements necessary for the approval of the Architect and at no additional cost to the District.

2.0 PRODUCTS

2.1 FASTENINGS

- A. Furnish all finish hardware with all necessary screws, bolts, and other fasteners of suitable size and type to anchor the hardware in position for long life under hard use.

- B. Furnish fastenings where necessary with expansion shields, toggle bolts, hex bolts, and other anchors approved by the Architect, according to the material to which the hardware is to be applied and the recommendation of the hardware manufacturer.
- C. When flush bolts occur in path of travel, provide accessible flush bolt (automatic).
- D. Door closer shall comply with 11B-404.2.8.1, door closer delay time. Minimum Delay Time: 5 seconds to move from 90° to 12° from latch. Maximum closer-effort: 5 pounds exterior doors, 5 pounds interior doors and minimum effort to latch door.
- E. The Authority having Jurisdiction, may increase the maximum effort to operate fire doors to achieve positive latching, but not to exceed 15 lbs max.
- F. All fastenings shall harmonize with the hardware as to material and finish.

2.2 FINISH HARDWARE REQUIREMENTS

- A. Refer to 3.2 A & B of this Section for Schedule.
- B. Thresholds in the path of travel shall conform with 11B-404.2.5.
- C. Hand-activated hardware, including lever-type hardware, panic bars, push-pull activating, shall be between 34" to 44" AFF.
- D. Lever handles for thumb turn dead bolt per 11B-309.4.
- E. Maximum effort to unlatch panic hardware must be 15 lb. in direction of travel.

2.3 KEYING

- A. Construction Keying:
 - 1. Construction key all locks; provide six construction keys and one extractor key.
- B. Final Keying System:
 - 1. All locks keyed per District's instructions.
- C. Deliver all keys to the District.
- D. Contractor shall provide a method independent of the final keying system for securing the building during construction and shall provide the SUHSD Facilities and Operations Department with construction keys and IC control keys.

- E. Primus cylinders should be 0 bitted. When contractor is ready for installing the cylinders, the SUHSD Facilities and Operation Department will pin them according to their keying schedule. Contractor will then install the pinned cylinders.
- F. Keying System:
 - 1. Provide keyed cylinders to provide master and grand master keying system. Based on the Districts direction.

3.0 EXECUTION

3.1 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturer's recommendations as approved by the Architect, anchoring all components firmly into position for long life under hard use.
- B. Doorstops must be mounted within 4-inches of wall in path of travel.

3.2 HARDWARE SCHEDULE

A. MANUFACTURER'S SYMBOLS

SCH	SCHLAGE	LOCKSETS, STRIKE, CYLINDERS
VON	VON DUPRIN	EXIT DEVICE
LCN	LCN	CLOSERS

B. GATE HARDWARE

- 1. General:
 - a. Finish throughout to be powdercoat black unless noted otherwise.
 - b. Hinges shall be non-removable pin (NRP) type.
- 2. Hardware Groups
 - a. Group A (G1, G2, G8) Ornamental Gate with Panic Hardware

Closer	(LCN 4040XP)
Panic Device	(VON 99L-2 x VR 996L-R/V Series Trim)
Rim Cylinder	(SCH Cylinder)
Lockset	(SCH ND75PD)
Hinge	(Maxum King Hinge)
Door Stop	(2"x2"x1/4" Angle with hook and eye)
 - b. Group B (G3) Ornamental Gate with latch, lockset and cane bolt

Closer	(LCN 4040XP)
Panic Device	(VON 99L-2 x VR 996L-R/V Series Trim)
Rim Cylinder	(SCH Cylinder)
Lockset	(SCH ND75PD)
Hinge	(Maxum King Hinge)
Cane Bolt	(3/4" dia. can bolt)
Door Stop	(2"x2"x1/4" Angle with hook and eye)

c. Group C (G4, G5, G6, G7) Chain link Gate with hasp and padlock

Hinge	(Maxum King Hinge)
Hasp	(2"x2"x1/4" Angle Locking Center Hasp)
Cane Bolt	(3/4" dia. can bolt)

d. Group D (G9) Metal Gate with hasp and padlock

Hinge	(Maxum King Hinge)
Hasp	(2"x2"x1/4" Angle Locking Center Hasp)
Cane Bolt	(3/4" dia. can bolt)

e. Group E (G10) Rolling Ornamental Gate with hasp and padlock

Hinge	(Maxum King Hinge)
Hasp	(2"x2"x1/4" Angle Locking Center Hasp)
Cane Bolt	(3/4" dia. can bolt)
Slide Gate Operator	See Electrical Drawings
Loop Detector	See Electrical Drawings
Entry Keypad	See Electrical Drawings
Keypad Pedestal	See Electrical Drawings

3.3 CLEANING

- A. Upon completion, clean the work of this Section in accordance with recommendations of the manufacturers of the materials used.
- B. Provide required protection of products to prevent damage and wear prior to acceptance of the work by the District.

3.4 WARRANTY

- A. The products delivered shall be free from defects.
- B. Manufacturer's standard performance warranty, as available for specified installation and environmental conditions.

END OF SECTION

SECTION 087100 – DOOR HARDWARE

1.0 GENERAL

1.9 SUMMARY

- J. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- K. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- C. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
 - 2. Overhead rolling doors.
 - 3. Other doors to the extent indicated.
- D. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Cylinders specified for doors in other sections.

1.2 RELATED SECTIONS

- A. Section 081100 - Metal Doors, Windows and Frames
- B. Section 081117 - Prefinished Steel Door Frames
- C. Section 081416 - Flush Wood Doors

1.3 REFERENCES

- A. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.

4. NFPA 80 - Fire Doors and Windows.
 5. NFPA 101 - Life Safety Code.
 6. NFPA 105 - Installation of Smoke Door Assemblies.
 7. State Building Codes, Local Amendments.
- B. Standards: All hardware specified herein shall comply with the following industry standards:
1. ANSI/BHMA Certified Product Standards - A156 Series
 2. UL10C – Positive Pressure Fire Tests of Door Assemblies

1.4 SUBMITTALS

- J. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- K. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.

- C. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- E. Informational Submittals:
 - 1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.
 - 2. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals.

1.5 QUALITY ASSURANCE

- J. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- K. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- L. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- M. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

- N. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
- O. California Building Code: Provide hardware that complies with CBC Section 11B.
 - 1. All openings as a part of an accessible route shall comply with CBC Section 11B-404.
 - 2. The clear opening width for a door shall be 32" minimum. For a swinging door it shall be measured between the face of the door and the stop, with the door open 90 degrees. There shall be no projections into it below 34" and 4" maximum projections into it between 34" and 80" above the finish floor or ground. Door closers and stops shall be permitted to be 78" minimum above the finish floor or ground. CBC Section 11B-404.2.3.
 - 3. Operable hardware on accessible doors shall comply with CBC Section 11B-309.4 and shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. Operable parts of such hardware shall be 34" minimum and 44" maximum above finish floor or ground. Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both sides.
- G. Hardware (including panic hardware) shall not be provided with "nightlatch" function for any accessible doors or gates unless the following conditions are met:
 - 1. Such hardware has a 'dogging' feature and is dogged during the time the facility is open.
 - 2. All 'dogging' operation is performed only by employees as their job function (non-public use).
- H. The force for pushing or pulling open a door shall be in accordance with CBC Section 11B-404.2.9.
 - 1. Interior hinged doors, sliding or folding doors, and exterior hinged doors: 5 pounds (22.2 N) maximum. Required fire doors: the minimum opening force allowable by the DSA authority, not to exceed 15 pounds (66.7N). These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door in a closed position.
 - 2. The force required for activating any operable parts, such as lever hardware, or disengaging other devices shall be 5 pounds (22.2N) maximum to comply with CBC Section 11B-309.4.
- I. Door closing speed shall comply with CBC Section 11B-404.2.8. Closers shall be adjusted so that the required time to move a door from an open position of 90 degrees to a position of 12 degrees from the latch is 5 seconds minimum. Spring hinges shall be adjusted so that the required time to move a door from an open position of 70 degrees to the closed position is 1.5 seconds minimum.

- J. Floor stops shall not be located in the path of travel and 4” maximum from walls.
- K. Thresholds shall comply with CBC Section 11B-404.2.5.
- L. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- P. Keying Conference: Conduct conference to comply with requirements in Division 01, Section Project Meetings. Keying conference to incorporate the following criteria into the final keying schedule document:
 - 1. Function of building, purpose of each area and degree of security required.
 - 2. Plans for existing and future key system expansion.
 - 3. Requirements for key control storage and software.
 - 4. Installation of permanent keys, cylinder cores and software.
 - 5. Address and requirements for delivery of keys.
- Q. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01, Section Project Meetings with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
 - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 - 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 - 3. Review sequence of operation narratives for each unique access controlled opening.
 - 4. Review and finalize construction schedule and verify availability of materials.
 - 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- R. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.6 DELIVERY, STORAGE, AND HANDLING

- J. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- K. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- L. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.7 COORDINATION

- J. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- K. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.8 WARRANTY

- J. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- K. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

- 4. Electrical component defects and failures within the systems operation.
- L. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- M. Special Warranty Periods:
 - 1. Ten years for mortise locks and latches.
 - 2. Seven years for heavy duty cylindrical (bored) locks and latches.
 - 3. Twenty five years for manual surface door closer bodies.

1.9 MAINTENANCE SERVICE

- J. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

2.0 PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- K. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Hinges: ANSI/BHMA A156.1 certified butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.

- B. Quantity: Provide the following hinge quantity:
 - 1. Two Hinges: For doors with heights up to 60 inches.
 - 2. Three Hinges: For doors with heights 61 to 90 inches.
 - 3. Four Hinges: For doors with heights 91 to 120 inches.
 - 4. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.

- C. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
 - 1. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
 - 2. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.

- D. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
 - 1. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
 - 2. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

- E. Hinge Options: Comply with the following:
 - 1. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.

- F. Manufacturers:
 - a. Hager Companies (HA).
 - b. Ives; Allegion Architectural Door Accessories (IVE).

2.3 DOOR OPERATING TRIM

- A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
 - 1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
 - 2. Furnish dust proof strikes for bottom bolts.

3. Surface bolts to be minimum 8" in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
 4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
 5. Manufacturers:
 - a. Pemko/Rockwood Products; ASSA ABLOY Architectural Door Accessories (PE/RO).
 - b. Door Controls International (DC).
- B. Coordinators: ANSI/BHMA A156.3 certified door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.
1. Manufacturers:
 - a. Pemko/Rockwood Products; ASSA ABLOY Architectural Door Accessories (PE/RO).
 - b. Door Controls International (DC).
- C. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
 2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
 3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
- D. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
1. Manufacturers:
 - a. PE/Rockwood Products; ASSA ABLOY Architectural Door Accessories (PE/RO).
 - b. Ives; Allegion Architectural Door Accessories (IVE).

2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Cylinders: Original manufacturer cylinders complying with the following:
 - 1. Mortise Type: Threaded cylinders with rings and cams to suit hardware application.
 - 2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 - 3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
 - 4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 - 5. Keyway: Match Facility Standard.
- L. Keying System: Each type of lock and cylinders to be factory keyed.
 - 1. Conduct specified "Keying Conference" to define and document keying system instructions and requirements.
 - 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 - 3. New System: Key locks to a new key system as directed by the Owner.
- M. Key Quantity: Provide the following minimum number of keys:
 - 1. Change Keys per Cylinder: Two (2).
 - 2. Master Keys (per Master Key Level/Group): Five (5).
 - 3. Construction Keys (where required): Ten (10).
- N. Construction Keying: Provide construction master keyed cylinders.
- O. Key Registration List (Bitting List):
 - 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 - 2. Provide transcript list in writing or electronic file as directed by the Owner.

2.5 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Grade 1 certified.
- B. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.
- C. Locks are to be non-handed and fully field reversible.
- D. Manufacturers:
 - a. Schlage Hardware (SCH).

2.6 AUXILIARY LOCKS

- A. Cylindrical Deadlocks: ANSI/BHMA A156.36, Grade 1, cylindrical type deadlocks to fit standard ANSI 161 preparation and 1 3/8" to 1 3/4" thickness doors. Provide tapered collars to resist vandalism and 1" throw solid steel bolt with hardened steel roller pins. Deadlocks to be products of the same source manufacturer and keyway as other locksets.
- B. Manufacturers:
 - 1. Schlage Hardware (SCH).

2.7 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
- B. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
- C. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
- D. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
- E. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- F. Standards: Comply with the following:
 - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 - 2. Strikes for Bored Locks and Latches: BHMA A156.2.

3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
4. Dustproof Strikes: BHMA A156.16.

2.8 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
 1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
 3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
- B. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
 1. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
 2. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
- C. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
- D. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
- E. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.

- F. Rail Sizing: Provide exit device rails factory sized for proper door width application.
- G. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- H. Conventional Push Rail Exit Devices (Commercial Duty): ANSI/BHMA A156.3, Grade 1 certified panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Fabricate latchbolts from cast stainless steel, Pullman type, incorporating a deadlocking feature.
- I. Manufacturers:
 - 1. Von Duprin; Allegion Architectural Door Accessories (VON) – 900 Series.

2.9 REMOVABLE MULLIONS

- A. Tube Steel Removable Mullions: ANSI/BHMA A156.3 removable steel mullions with malleable-iron top and bottom retainers and a primed paint finish.
- B. Provide keyed removable feature where specified in the Hardware Sets.
- C. Provide stabilizers and mounting brackets as required.
- D. Provided electrical quick connection wiring options as specified in the hardware sets.
- E. Manufacturers:
 - 1. Von Duprin; Allegion Architectural Door Accessories (VON) – 900 Series.
 - 2. Sargent Manufacturing (SA) - 980S Series.
 - 3. Yale Locks and Hardware (YA) - M200 Series.

2.10 DOOR CLOSERS

- A. All door closers specified herein shall meet or exceed the following criteria:
 - 1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers including installation and adjusting information on inside of cover.
 - 2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
 - 3. Cycle Testing: Provide closers which have surpassed 15 million cycles in a test witnessed and verified by UL.

4. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the physically handicapped, provide units complying with ANSI ICC/A117.1.
 5. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
 6. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 7. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Commercial Duty): ANSI/BHMA 156.4, Grade 1 certified surface mounted, institutional grade door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck, closing sweep, and latch speed control valves. Provide non-handed units standard.
- C. Manufacturers:
1. Norton Door Controls (NO) - 8500 Series.

2.11 ARCHITECTURAL TRIM

- A. Door Protective Trim – General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
- B. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
- C. Where plates are applied to fire rated doors with the top of the plate more than 16" above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer's catalog and template book for specific requirements for size and applications.
- D. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
1. Stainless Steel: 300 grade, 050-inch thick.

- E. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
- F. Manufacturers:
 - 1. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - 2. Trimco (TC).
 - 3. Hiawatha, Inc. (HI).

2.12 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
- C. Manufacturers:
 - 1. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).
 - 2. Trimco (TC).
 - 3. Hiawatha, Inc. (HI).
- D. Overhead Door Stops and Holders: ANSI/BHMA A156.6, Grade 1 certified overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
- E. Manufacturers:
 - 1. Norton Door Controls (NO).
 - 2. Rockwood Products; ASSA ABLOY Architectural Door Accessories (RO).

2.13 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors

where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
- C. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- D. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
- E. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- F. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- G. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- H. Manufacturers:
 - 1. Pemko Products; ASSA ABLOY Architectural Door Accessories (PE).
 - 2. National Guard Products (NG).
 - 3. Reese Enterprises, Inc. (RE).

2.14 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.15 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards,

but in no case less than specified by referenced standards for the applicable units of hardware

- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

3.0 EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
- B. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- C. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
- D. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
- E. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

- F. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
- G. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- H. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- I. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- J. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect based on drawings dated 04/12/2019. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.
- C. MANUFACTURER'S SYMBOLS

SCH	SCHLAGE	LOCKSETS, STRIKE, CYLINDERS
PE (RO)	PEMKO (Rockwood)	THRESHOLD, GASKETING, WEATHER-STRIPPING
HAG	HAGER	BUTTS, HINGES
IVE	IVES	KICK PLATES, DOOR STOP, HINGES
VON	VON DUPRIN	EXIT DEVICE
NOR	NORTON	CLOSERS

Hardware Sets

Set: 1.00

Door: 112C

6	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Flush Bolt	2845	US32D	RO
1	Entrance Lock	AL50PD	630	SCH
1	Coordinator	COR Bar x Mtg Brkts	US28D	IVE
2	Surface Closer	8501 S/P arm to suit location	689	NO
2	Drop Plate	As Required	689	NO
2	Kick Plate	8400 10"H x 1" LDW CSK BEV	630	IVE
2	Door Stop	FS18S or OH stop where floor stop presents	Black	IVE
1	Threshold	270A series x Width, per detail		PE

Project: 855 East Laurel Drive Emergency Shelter
 Project No. 8875
 Bid No. 10736

1	Rain Guard	346C x full frame, omit @ overhang		PE
1	Gasketing	2891 APK		PE
2	Sweep	18061 CNB		PE

Set: 2.0

Door: 115C

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Rim Exit Device	99AX-2 x VR 900 Series Trim	630	VON
1	Rim Cylinder	Primus XP	626	SCH
1	Surface Closer	CLP8501R	689	NO
1	Drop Plate	As Required	689	NO
1	Kick Plate	8400 10"H x 1" LDW CSK BEV	630	IVE
1	Mop Plate	8400 4"H x 1" LDW CSK BEV	630	IVE
1	Door Stop	FS18S or OH stop where floor stop presents	Black	IVE
1	Threshold	270A series x Width, per detail		PE
1	Rain Guard	346C x full frame, omit @ overhang		PE
1	Perimeter Seal	S88D		PE
1	Gasketing	2891 APK		PE
2	Sweep	18061 CNB		PE

Set: 3.0

Door: 110B

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Classroom Lock	AL70PD	630	SCH
1	Cylinder	23-065, C123 Keyway	626	SCH
1	Surface Closer	8501 S/P arm to suit location	689	NO
1	Drop Plate	As Required	689	NO
1	Kick Plate	8400 10"H x 1" LDW CSK BEV	630	IVE
1	Door Stop	FS18S or OH stop where floor stop presents	Black	IVE
1	Threshold	270A series x Width, per detail		PE
1	Rain Guard	346C x full frame, omit @ overhang		PE
1	Perimeter Seal	S88D		PE
1	Gasketing	2891 APK		PE
2	Sweep	18061 CNB		PE

Set: 4.0

Door: 100A

6	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Removable Mullion	M200 x 7'	600	YA
2	Rim Exit Device	99AX-2 x VR 900 Series Trim	630	VON
2	Rim Cylinder	Primus XP	626	SCH
2	Cylinder	23-065, C123 Keyway	626	SCH
2	Door Pull	RM3330-24 Mtg-Type 6HD	US32D	RO

2	Surface Closer	8501 S/P arm to suit location	689	NO
2	Drop Plate	As Required	689	NO
2	Door Stop	FS18S or OH stop where floor stop presents	Black	IVE
1	Threshold	270A series x Width, per detail		PE
1	Rain Guard	346C x full frame, omit @ overhang		PE
1	Perimeter Seal	S88D		PE
1	Gasketing	2891 APK		PE
2	Sweep	18061 CNB		PE

Set: 5.0

Doors: 109B, 112A, 112B, 122D, 122E

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Rim Exit Device	99AX-2 x VR 900 Series Trim	630	VON
1	Rim Cylinder	Primus XP	626	SCH
1	Surface Closer	8501 S/P arm to suit location	689	NO
1	Drop Plate	As Required	689	NO
1	Kick Plate	8400 10"H x 1" LDW CSK BEV	630	IVE
1	Door Stop	FS18S or OH stop where floor stop presents	Black	IVE
1	Threshold	270A series x Width, per detail		PE
1	Rain Guard	346C x full frame, omit @ overhang		PE
1	Perimeter Seal	S88D		PE
1	Gasketing	2891 APK		PE
2	Sweep	18061 CNB		PE

Set: 6.0

Doors: 120A, 121A

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Push Plate	8200 12" x 3" 2 LDW	630	IVE
1	Surface Closer	8501 S/P arm to suit location	689	NO
1	Kick Plate	8400 10"H x 1" LDW CSK BEV	630	IVE
1	Mop Plate	8400 4"H x 1" LDW CSK BEV	630	IVE
1	Wall Stop	WS402CCV Gray	US26D	IVE
1	Gasketing	S88BL Width x Height		RO

Set: 7.0

Doors: 102A, 103A, 122B, 122C

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Storeroom Lock	AL80PD	626	SCH
1	Cylinder	23-065, C123 Keyway	626	SCH
1	Cont. Overhead Stop	6ADJ-X36	689	RF
3	Silencer	608-RKW Gray		RO

Set: 8.0

Project: 855 East Laurel Drive Emergency Shelter
Project No. 8875
Bid No. 10736

Doors: 101A, 104A, 106A, 107A, 108A

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Office Lock	AL50PD	626	SCH
1	Cylinder	23-065, C123 Keyway	626	SCH
1	Wall Stop	WS402CCV Gray	US26D	IVE
3	Silencer	608-RKW Gray		RO

Set: 9.0

Doors: 110A, 111A

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Classroom Lock	AL70PD	626	SCH
1	Cylinder	23-065, C123 Keyway	626	SCH
1	Surface Closer	8501 S/P arm to suit location	689	NO
1	Wall Stop	WS402CCV Gray	US26D	IVE
3	Silencer	608-RKW Gray		RO

Set: 10.0

Door: 119A

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Classroom Lock	AL70PD	626	SCH
1	Cylinder	23-065, C123 Keyway	626	SCH
1	Gasketing	S88BL Width x Height		RO

Set: 11.0

Door: 115B

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Storeroom Lock	AL80PD	626	SCH
1	Cylinder	23-065, C123 Keyway	626	SCH
1	Cont. Overhead Stop	6ADJ-X36	689	RF
1	Kick Plate	8400 10"H x 1" LDW CSK BEV	630	IVE
1	Mop Plate	8400 4"H x 1" LDW CSK BEV	630	IVE
1	Gasketing	S88BL Width x Height		RO

Set: 12.0

Door: 118A

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Storeroom Lock	AL80PD	626	SCH
1	Cylinder	23-065, C123 Keyway	626	SCH
1	Cont. Overhead Stop	6ADJ-X36	689	RF
1	Surface Closer	8501 S/P arm to suit location	689	NO
1	Kick Plate	8400 10"H x 1" LDW CSK BEV	630	IVE
3	Silencer	608-RKW Gray		RO

Set: 13.0

Doors: 109A, 113A

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Office Lock	AL70PD	626	SCH
1	Cylinder	23-065, C123 Keyway	626	SCH
1	Surface Closer	8501 S/P arm to suit location	689	NO
1	Kick Plate	8400 10"H x 1" LDW CSK BEV	630	IVE
1	Wall Stop	WS402CCV Gray	US26D	IVE
1	Gasketing	S88BL Width x Height		RO

Set: 14.0

Door: 104B

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Office Lock	AL50PD	626	SCH
1	Cylinder	23-065, C123 Keyway	626	SCH
1	Kick Plate	8400 10"H x 1" LDW CSK BEV	630	IVE
3	Silencer	608-RKW Gray		RO

Set: 15.0

Doors: 114A, 123A, 124A, 125A

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Privacy Set Lock	AL85PD	626	SCH
1	Wall Stop	WS402CCV Gray	US26D	IVE
1	Gasketing	S88BL Width x Height		RO

Set: 16.0

Door: 116B

6	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
2	Multi-Point Lock	Equivalent to Sargent WD701515 ERL	626	SCH
2	Door Pull	8102HD 3/4" x 8" x 2.5 Projection	630	IVE
2	Push Plate	8200 12" x 3" 2 LDW	630	IVE
2	Surface Closer	8501 S/P arm to suit location	689	NO
2	Kick Plate	8400 10"H x 1" LDW CSK BEV	630	IVE
2	Mop Plate	8400 4"H x 1" LDW CSK BEV	630	IVE
2	Wall Stop	WS402CCV Gray	US26D	IVE
1	Gasketing	S88BL Width x Height		RO

Set: 17.0

Door: 116A

6	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
2	Door Pull	8102HD 8" x 2.5 Projection	630	IVE
2	Push Plate	8200 12" x 3" 2 LDW	630	IVE
2	Surface Closer	8501 S/P arm to suit location	689	NO

Project: 855 East Laurel Drive Emergency Shelter
 Project No. 8875
 Bid No. 10736

2	Kick Plate	8400 10"H x 1" LDW CSK BEV	630	IVE
2	Mop Plate	8400 4"H x 1" LDW CSK BEV	630	IVE
2	Wall Stop	WS402CCV Gray	US26D	IVE
6	Silencer	608-RKW Gray		RO

Set: 18.0 – Not Used

Set: 19.0

Doors: 113A – 134B

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Passage Lock	AL10S	626	SCH
1	Dead Bolt	B660P	626	SCH
1	Wall Stop	WS402CCV Gray	US26D	IVE
3	Silencer	608-RKW Gray		RO

Set: 20.0

Door: 117A

3	Hinge (Heavy Wt)	BB1199 NRP	US32D	HAG
1	Office Lock	AL50PD	626	SCH
1	Door Stop	FS41	626	IVE
1	Mop Plate	8400 4"H x 1" LDW CSK BEV	630	IVE
1	Kick Plate	8400 10"H x 1" LDW CSK BEV	630	IVE
1	Push Plate	8200 12" x 3" 2 LDW	630	IVE

Set: 21.0

Door: 115A

1	Cylinder	23-065, C123 Keyway	626	SCH
1	Balance of Hardware	By Door Manufacturer		

END OF SECTION

SECTION 088100 – GLASS AND GLAZING

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provision of glass and glazing as shown on project Drawings and as specified herein.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 079000 - Sealants and Caulking: Provision of sealants.
- C. Section 081100 - Metal Doors, Windows and Frames: Provision of steel doors and windows.
- D. Section 081117 – Prefinished Steel Door Frames: Provision of prefinished door frames.
- E. Section 081416 - Flush Wood Doors: Provision of wood doors.

1.3 REFERENCES

- A. ANSI - American national Standards Institute
 - 1. Z97.1 - Safety Glazing Materials Used in Buildings – Safety Performance Specifications and Methods of Test.
- B. ASTM - American Society for Testing and Materials
 - 1. C1036 - Standard Specification for Flat Glass.
 - 2. C1048 - Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
 - 3. E152 - Methods of Fire Tests of door Assemblies.
 - 4. E163 - Fire Tests of Window Assemblies.

5. E774 - Standard Specification for Sealed Insulating Glass Units.
 6. E1300 - Practice for Determining the Minimum Thickness of Annealed Glass Required to Resist a Specified Load.
- C. CBC - California Building Code, 2001 Edition
- D. CPSC - Consumer Products Safety Commission
1. 16 CFR Part 1201 - Safety Standard for Architectural Glazing Materials.
- E. GANA - Glass Association of North America
- F. UL - Underwriters Laboratories, Inc.

1.4 SYSTEM DESCRIPTION

- A. Performance Requirements - Glass and Glazing
1. Provide glass and glazing that has been produced, fabricated and installed to withstand movement without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glass and glazing materials and other defects in the work.
 2. Glass Design: Glass thicknesses indicated on the Drawings are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for the various size openings in the thicknesses and strengths (annealed or heat-treated) to meet or exceed the following criteria:
 - a. Minimum glass thickness, nominally, of lites in exterior walls is 0.23- inches.
 - b. Minimum glass thicknesses of lites, whether composed of annealed or heat-treated glass, are selected so the worst-case probability of failure does not exceed the following: 8 lites per 1000 for lites set vertically or not over 15 degrees off vertical and under wind action. Determine minimum thickness of monolithic annealed glass according to ASTM E1300. For other than monolithic annealed glass, determine thickness per glass manufacturer's standard method of analysis including applying adjustment factors to ASTM E1300 based on type of glass.
 3. Normal thermal movement results from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on

materials' actual surface temperatures due to both solar heat gain and nighttime sky heat loss.

- a. Temperature Change (Range): 120 degrees Fahrenheit ambient, 180 degrees Fahrenheit material surfaces.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each glass product and glazing material indicated.
- B. Samples: Submit samples for verification purposes of 12 inch square samples of each type of glass indicated except for clear monolithic glass products, and 12 inch long samples of each color required for each type of sealant or gasket exposed to view. Install sealant or gasket sample between 2 strips of material representative in color of the adjoining framing system.
- C. Quality Control Submittals
 1. Test Reports
 - a. Compatibility and adhesion test reports from sealant manufacturer indicating that glazing materials were tested for compatibility and adhesion with glazing sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed for adhesion.
 - b. Compatibility test report from manufacturer of insulating glass edge sealant indicating that glass edge sealants were tested for compatibility with other glazing materials including sealants, glazing tape, gaskets, setting blocks, and edge blocks.
 - c. Product test reports for each type of glazing sealant and gasket indicated, evidencing compliance with requirements specified.
 2. Certificates
 - a. Product certificates signed by glazing materials manufacturers certifying that their products comply with specified requirements.
 - b. Separate certifications are not required for glazing materials bearing manufacturer's permanent labels designating type and thickness of glass, provided labels represent a quality control program of a recognized certification agency or independent testing agency acceptable to authorities having jurisdiction.

1.6 QUALITY ASSURANCE

A. Qualifications

1. Fabricator shall have minimum of 5 years experience in fabricating units similar to those specified herein on Projects comparable to this Project.

B. Regulatory Requirements

1. Glass and glazing shall meet requirements of CBC Chapter 24.
2. Safety Requirements: Provide glass and glazing complying with ANSI Z97.1 and CBC Chapter 24 and testing requirements of CPSC 16 CFR Part 1201 for Category II materials.
3. Fire Resistive Glazing Products: Products identical to those tested in accordance with ASTM E152 for doors and ASTM E163 for window assemblies: both labeled and listed by UL.

C. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: "GANA Glazing Manual".

D. Mockups: Provide full size mockup of frit glass assembly. Assembly can remain in place if accepted.

1.7 DELIVERY, STORAGE, AND HANDLING

- ### A. Protect glazing materials to comply with manufacturer's directions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.8 PROJECT CONDITIONS

- ### A. Environmental Conditions: Do not proceed with glazing when ambient and substrate temperature conditions are outside the limits permitted by glazing materials manufacturer or when glazing channel substrates are wet from rain, condensation, or other causes.

1.9 WARRANTY

A. Submit written warranty for the following:

1. Laminated Glass: Replace laminated glass units which develop edge

separation or delamination which materially obstructs vision through glass.

- a. Warranty Period: Manufacturer's standard but not less than 5 years.
2. Insulating Glass: Replace insulating glass units which develop failure of hermetical seal of air space, provided the manufacturer's instructions for handling, installing, protecting and maintaining units have been complied with during the guarantee period.
 - a. Warranty Period: Manufacturer's standard but not less than 10 years.
- B. By terms of warranty, also agree to remove or replace other work, as required, which has been connected to or superimposed on substrate material to be replaced.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer
 1. Typical: Pittsburg Glass; PPG Industries, Inc.; Viracon Ford Glass Division; AFG Industries, Inc., or equal.

2.2 MATERIALS

- A. Glass Types. See Drawings for locations.
 1. Type A - Interior
 - a. Float Glass: ASTM C1036, Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), 1/4-inch thick, unless otherwise noted.
 2. Type B – Interior and Exterior
 - a. Float Glass: ASTM C1048, Kind FT (fully tempered) Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), 1/4-inch thick, unless otherwise noted.
 3. Type C - Exterior
 - a. Float Glass: Low-E, ASTM C1048, Kind FT (fully tempered) Type I (transparent glass, flat), Class 1 (clear), Quality q3

(glazing select), 1/4- inch thick, unless otherwise noted.

- b. Color: As manufactured by Viracon VE1-2M2, PPG Industries, Inc., or equal.

4. Type D – Not Used

- a. Float Glass: ASTM C1048, Kind FT (fully tempered) Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), 3/16-inch thick, unless otherwise noted.

5. Type E – Not Used

- a. Float Glass: Clear, Low-E, ASTM C1048, Kind FT (fully tempered) Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), 3/16-inch thick, unless otherwise noted.
- b. Color: As manufactured by Viracon VE1-2M#2, PPG Industries, Inc., or equal.

6. Type F – Not Used

- a. Float Glass: Low-E, ASTM C1048, Kind FT (fully tempered) Type I (transparent glass, flat), Class 1 (clear), Quality q3 (glazing select), 1/4- inch thick, unless otherwise noted.
- b. Color: As manufactured by Viracon VE1-2M2, PPG Industries, Inc., or equal.
- c. Frit: V-175 White silkscreen #5006, with 1/8-inch dots on surface #2.

7. Type G - Exterior

- a. Insulating glass, 1 inch overall thickness, consisting of the following:
 - i) Outboard Layer: Glass Type C.
 - ii) Air Space: 1/2-inch air,
 - 1) Sealing System: Dual seal with polyisobutylene primary seal and silicone secondary seal, black color.

- 2) Spacer material: Manufacturer's standard dark metal.
 - 3) Dessicant: Manufacturer's standard; either molecular sieve or silica gel, or a blend of both.
 - b. Inboard Layer: Glass Type B.
 8. Type H – Not Used
 - a. Insulating glass, 1 inch overall thickness, consisting of the following:
 - i) Outboard Layer: Glass Type C.
 - ii) AirSpace: 1/2-inch air,
 - 1) Sealing System: Dual seal with polyisobutylene primary seal and silicone secondary seal, black color.
 - 2) Spacer material: Manufacturer's standard dark metal.
 - 3) Dessicant: Manufacturer's standard; either molecular sieve or silica gel, or a blend of both.
 - b. Inboard Layer. Glass Type F.
- B. Fire Rated Safety Glass:
 1. Laminated Ceramic Glazing Material: Proprietary Category II safety glazing product in the form of 2 lites of clear ceramic glazing material laminated together to produce a laminated fite of 5/16-inch nominal thickness; polished on both surfaces; weighing 4 lb/sq. ft.; and as follows:
 - a. Fire-Protection Rating: As indicated for the assembly in which glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
 - b. Polished on both surfaces, transparent.
 - c. Logo: Each piece of fire rated glazing shall be labeled with a permanent logo including name of product, manufacturer, testing laboratory (UL), fire rating period, safety glazing standards, and date of manufacture.

- d. Product: "FireLite Plus" by Nippon Electric Glass Co., Ltd., and distributed by Technical Glass Products.

C. Glazing Accessories

1. Setting Blocks, Spacers and Edge Blocks: Neoprene, EPDM or silicone blocks as required for compatibility with glazing sealants, 80 to 90 Shore A durometer hardness.
2. Sealant: One part non-acid curing silicone type, as manufactured by Dow Corning Corp., "795"; General Electric Corp., "Silpruf; Tremco, Inc., "Spectrum 2", or equal.
3. Glazing Tape: Provide manufacturer's standard solvent free butyl-polyisobutylene formulation with solids content of 100 percent; in extruded tape form; non-staining and non-migrating in contact with nonporous surfaces; packaged on rolls with release paper on 1 side; with or without continuous spacer rod as recommended by manufacturers of tape and glass for application indicated.
4. Glazing Gasket: Molded or extruded neoprene gasket or PVC gasket in black color.

2.3 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for the Project, with edge and face clearances, edge and surface conditions, and bite complying with recommendations of product manufacturer and referenced glazing standard as required to comply with system performance requirements.

3.0 EXECUTION

3.1 EXAMINATION

- A. Examine glass framing, with glazier present, for compliance with the following:
 1. Manufacturing and installation tolerances, including those for size, squareness, offsets at comers.
 2. Presence and functioning of weep system.
 3. Minimum required face or edge clearances.
 4. Effective sealing between joints of glass-framing members.
- B. Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings that are not firmly bonded to substrates.

3.3 GLAZING, GENERAL

- A. Comply with combined recommendations of manufacturers of glass, sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those in referenced glazing publications.
- B. Glazing channel dimensions as indicated on Drawings provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- C. Protect glass from edge damage during handling and installation as follows:
 - 1. Use a rolling block in rotating glass units to prevent damage to glass corners. Do not impact glass with metal framing. Use suction cups to shift glass units within openings; do not raise or drift glass with a pry bar. Rotate glass lites with flares or bevels on bottom horizontal edges so edges are located at top of opening, unless otherwise indicated by manufacturer's label.
 - 2. Remove damaged glass from Project site and legally dispose of off site. Damaged glass is glass with edge damage or other imperfections that, when installed, weaken glass and impair performance and appearance.
- D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- E. Install elastomeric setting blocks in sill rabbets, sized and located to comply with referenced glazing standard, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
- F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
- G. Provide spacers for glass sizes larger than 50 united inches (length plus height) as follows:
 - 1. Locate spacers inside, outside, and directly opposite each other. Install correct size and spacing to preserve required face clearances, except where gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and comply with system performance requirements.

- 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- H. Provide edge blocking to comply with requirements of referenced glazing publications, unless otherwise required by glass manufacturer.
- I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that when compressed by glass their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously but not in one continuous length. Do not stretch tapes to make them fit opening.
- C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at comers of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each lite is installed.
- F. Apply heel bead of elastomeric sealant.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at comers and work toward centers of openings.
- H. Apply cap bead of silicone sealant over exposed edge of tape.

3.5 GASKET GLAZING

- A. Cut gasket with mitered comers to length of channel without stretching.

3.6 PROTECTION AND CLEANING

- A. Protect exterior glass from breakage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

- B. Protect glass from contact with contaminating substances resulting from construction operations including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkali deposits, or stains, and remove as recommended by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents and vandalism, during construction period.
- E. Wash glass on both faces in each area of Project not more than 4 days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

END OF SECTION

**Division 9:
Finishes**

SECTION 092900 – GYPSUM BOARD

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Section Includes:
 - 1. Provision of gypsum board screw attached to wood framing and furring members, joint treatment and accessories.
 - 2. Provision of silicone impregnated gypsum board.
 - 3. Installation of sound deadening insulation in walls and ceilings and including acoustical sealant, tape and the like for work of this Section.
- D. Products Installed but not Furnished under this Section
 - 1. Sound deadening insulation as specified in Section 072116.
 - 2. Acoustical sealant as specified in Section 079000.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 054000 - Cold-Formed Metal Framing: Provision of metal framing.
- C. Section 055000 - Metal Fabrications: Provision of metal framing.
- D. Section 072116 - Blanket Insulation
- D. Section 079000 - Sealants and Caulking: Provision of caulk.
- E. Section 097813 - Stainless Steel Wall Panels
- F. Section 099100 - Painting: For finish painting.
- G. Section 097200 - Projection Dry Erase Wallcovering

1.3 REFERENCES

- A. ASTM - American Society for Testing and Materials
 - 1. C36 - Standard Specification for Gypsum Wallboard.
 - 2. C79 - Test Method for Gypsum Sheathing Board.
 - 3. C475 - Standard Specification for Joint Treatment materials for gypsum Wallboard Construction.
 - 4. C630 - Standard Specification for Water-Resistant Gypsum Backing Board.
 - 5. C840 - Standard Specification for Application and Finishing of Gypsum Board.
 - 6. C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Studs from 0.33 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
 - 7. C1002 - Standard Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases,
 - 8. C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 - 9. D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
 - 10. E119 - Method for Fire Tests of Building Construction and Materials.
 - 11. E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 Degrees C.
- B. CBC - California Building Code, 2016 Edition
- C. GA - Gypsum Association
 - 1. 216 - Application and Finishing of Gypsum Board.
- D. UL - Underwriters Laboratories, Inc.

1.4 SYSTEM DESCRIPTION

- A. Design Requirements: Where indicated, provide materials and construction which are identical to those assemblies whose fire resistance rating has been determined in

accordance with ASTM E119 by a testing and inspecting organization acceptable to authorities having jurisdiction.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's product data. Include the following:
 - 1. Fire Resistance Data: Include required fire test results for gypsum board systems on partitions, ceilings and columns. Correlate with supporting steel framing details.
 - 2. Sound Transmission Data: Include certified evidence that installed gypsum board systems and materials meet required STC levels.
- B. Samples:
 - 1. Provide minimum 12" x 12" coated gypsum board panel of each type and texture of textured coating.

1.6 QUALITY ASSURANCE

- A. Fire Test Response Characteristics: Where fire resistance rated gypsum board assemblies are indicated, provide gypsum board assemblies that comply with the following requirements:
 - 1. Fire Resistance Ratings: As indicated by GA File Numbers in GA-600 "Fire Resistance Design Manual" or design designations in UL "Fire Resistance Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 2. Gypsum board assemblies indicated are identical to assemblies tested for fire resistance according to ASTM E119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.
 - 3. Deflection and Firestop Track: Top runner provided in fire resistance rated assemblies indicated is labeled and listed by UL, Intertek Testing Agency, or another testing and inspecting agency acceptable to authorities having jurisdiction.
- B. Qualifications of Installers:
 - 1. Use only skilled and experienced gypsum board installer for laying up the gypsum board, fastening, taping and finishing.
 - 2. Helpers and apprentices used in this portion of the Work shall be under full and constant supervision at all times by thoroughly skilled gypsum board installers.

3. In the acceptance or rejection of installed gypsum board, no allowance will be made for lack of skill on the part of installers.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Acceptance at Site: Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier. Verify board and accessories as undamaged.
- B. Storage and Protection
 1. Store materials inside under cover and keep dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.
 2. Handle gypsum boards to prevent damage to edges, ends and surfaces.

1.8 PROJECT CONDITIONS

- A. Environmental Conditions
 1. Establish and maintain environmental conditions for application and finish gypsum board to comply with ASTM C840 and with gypsum board manufacturer's recommendations. Maintain not less than 40 degrees Fahrenheit minimum room temperature.
 2. Ventilate building spaces to remove water not required for drying joint treatment materials. Avoid drafts during day, hot weather to prevent materials from drying too rapidly.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: United States Gypsum Co.; Gold Bond Building Products Div., National Gypsum Co.; Pacific Coast Building Products, Pabco Gypsum Division, or equal.

2.2 MATERIALS

- A. USG sheetrock® brand mold tough® VHI Firecode® X Panels, ASTM C1629
 1. Panel Type: Moisture-Resistant/Impact-Resistant
 2. Thickness: 5/8 in.
 3. Panel size: 48 inches wide x 96 inches to 144 inches.

4. Weight: 2.8 lbs./sq. ft.
 5. Edges: Tapered edge for finished surfaces; butt edge for concealed surfaces.
 6. Surface Burning Characteristics, per ASTM E84:
 - a. Flame Spread Index: 15
 - b. Smoke Developed: 0
 7. Locations: Wet areas and as indicated on Drawings.
- B. USG sheetrock® brand Ecosmart Panels Firecode® X, ASTM C1396
1. Thickness: 5/8 in.
 2. Panel size: 48 inches wide x 96 inches to 144 inches.
 3. Weight: 2.8 lbs./sq. ft.
 4. Edges: Tapered edge for finished surfaces; butt edge for concealed surfaces.
 5. Surface Burning Characteristics, per ASTM E84:
 - a. Flame Spread Index: 15
 - b. Smoke Developed: 0
 6. Locations: Interior areas.
- C. Fasteners
1. Screws: ASTM C1002, Type "S" steel drill screws for fastening gypsum board to gypsum board, and steel framing members less than 0.033-inch thick. ASTM C954 Type "S-12" steel drill screws for fastening gypsum board to steel framing members 0.033 to 0.112-inch thick.
- D. Accessories
1. Comer Beads and Casing Beads: ASTM C1047, sheet steel zinc coated by hot-dip process. Flanges shall be free of dirt, grease and other materials that may adversely affect bond of joint treatment. System shall be recommended by the manufacturer of the gypsum panels as being compatible with the panels specified herein.
 2. Reveal Picture Hanger: Where indicated on drawings provide Fry Reglet Reveal/Picture Hanger as manufactured by Fry Reglet Corporation. Extruded aluminum shall be 6063 T5 alloy with chemical conversion coating. Provide a

total of 24 hanger clips for use with the picture hanger rail.

3. Reveal Base: Where indicated on drawings, provide extruded aluminum base with a reveal depth of 5/8-inch and a reveal width of 8 inches.
- E. Joint Treatment Materials: Products of one manufacturer conforming to ASTM C475, ASTM C840 and recommendations of manufacturer of both gypsum board and joint treatment materials for application indicated. Conform to GA 201 and GA 216 for reinforcing tape, joint compound and water.
1. Joint Tape
 - a. Cross-laminated, tapered edge, reinforced paper or fiber glass mesh tape as recommended by setting type joint compound manufacturer.
 - b. Fiberglass mesh tape for use with gypsum sheathing board with water-resistant core.
 2. Setting Type Joint Compound: Factory prepackaged, job mixed, chemical hardening powder products formulated for uses indicated or factory premixed product.
- F. Acoustical Sealant: As specified in Section 079000.
1. Sealant shall be non-drying, non-hardening, non-skinning, non-staining, non-bleeding, gunnable type as recommended by the manufacturer of gypsum panels specified herein.

3.0 EXECUTION

3.1 EXAMINATION

- A. Examine areas and surfaces to receive gypsum board and verify the following:
1. Prior to all work of this Section, carefully inspect the installed work of other trades and verify that all such work is complete to the point where installation may properly commence.
 2. Proper alignment and spacing of backing and framing support systems.
 3. Verify that gypsum board may be installed and finished with all surfaces true to line and detail, level, plumb, and in accordance with the design but without excessive thicknesses of skim coating or texture.
 4. Complete installation of mechanical, electrical or other items to be enclosed in partitions that cannot be installed after installation of board.

B. Corrections:

1. In the event of discrepancy, immediately notify the Architect.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been resolved.

3.2 PREPARATION

A. Protect surrounding areas and surfaces to preclude damage.

1. Exercise care to avoid soiling, spatter and damage to work of other trades.
2. Use cover cloths or other means of protection. Remove, clean and repair any soiled or damaged work as required.
3. Protect from damage at all times.

3.3 INSTALLATION

A. Gypsum Board

1. Install and finish gypsum board to comply with ASTM C840 or GA 216.
 - a. Single Layer; Install in accordance with ASTM C840, except as amended or required by specific fire resistive or sound isolation system detailed. In that instance, application shall conform to requirements of the manufacturer's tests as reviewed and accepted in the submittal.
 - b. Double Layer: Conform to applicable portions of ASTM C840, System Classification VIII for installations applied with screws. Conform to required fire resistance standards.
2. Install all panels plumb, level, and with all vertical joints on bearing, and in accordance with manufacturer's recommended methods for installation.
3. Apply in vertical direction with ends and edges falling on supports. In vertical applications, gypsum board shall be of length required to reach full height of vertical surfaces in one continuous piece.
4. Position boards so that like edges abut, tapered edges against tapered edges and field cut ends against field cut ends. Do not place tapered edges against cut edges or ends. Stagger vertical joints over different studs on opposite sides of partitions.
5. Start installation of panels at exterior wall to position butt joints as far away from exterior wall as possible.

6. Cutting:

- i. When cutting gypsum panels is required, cut by scoring and breaking or by sawing, working from the face side.
- ii. When cutting by scoring, cut through the face paper and then snap the panel back away from the cut face; then break the back paper by snapping the gypsum panel in the reverse direction or by cutting the back paper.
- iii. Smooth all cut ends and edges of panels as necessary to obtain a smooth joint.
- iv. For cut-outs on panels or pipes, fixtures, and other small openings, make holes and cut-outs by sawing or by such other method as will not fracture the core or tear the covering, and with such accuracy that plates, escutcheons, or trim will cover the edges.
- v. The use of “score-and-knockout” method will not be permitted.

7. Fastening:

- i. Attach gypsum board to framing with screws, lengths and sizes as recommended by manufacturer and in accordance with CBC.
- ii. Properly space all fasteners in careful accordance with the manufacturer's recommendations and code requirements, with heads driven slightly below the surface for proper cementing but without breaking the paper cover.
- iii. Loosely butt all joints to be taped; firmly butt all joints to be left exposed.
- iv. Stagger all end joints and the joints between panels to achieve a maximum of bridging, and a minimum of continued joints.

8. Accessories:

- i. Install comer beads at vertical and horizontal external comers.
- ii. Install casing beads whenever edge of gypsum board would otherwise be exposed or semi-exposed, or where abutting dissimilar materials.
- iii. After accessories are installed, correct surface damage and defects.
- iv. Install trims and expansion joints where required.

- B. Fire Resistant Assemblies: Wherever fire rated gypsum board construction is indicated, provide materials and installation methods, including types and spacing of fasteners, in accordance with CBC. Apply firestopping at top of wall and at penetrations through fire resistant assembly in accordance with Section 078400.
- C. Sound Retardant Installations
 - 1. Follow manufacturer's directions and specifications for conditions of installation. Install where indicated. Include around all Toilet Rooms, whether indicated or not. Install from floor surface to bottom side of next floor surface.
 - a. Wrap with insulation and seal electrical or other outlets in sound isolating partitions.
 - b. Install sealant to completely fill void between gypsum board edges and adjacent surface.
- D. Wet Locations
 - 1. At Walls and Ceilings: Conform to ASTM C840, System Classification X.
 - 2. Treat cut edges and holes in water resistant gypsum board with sealant
- E. Access Doors: Install gypsum board into access door frames specified in Section 083113 where required and where indicated on the Drawings. Anchor firmly into position, and align properly to achieve an installation flush with adjacent finished surfaces.
- G. Allowable Tolerances:
 - 1. Offset Between Planes of Board Faces: 1/16-inch.
 - 2. Plane, Level, Warp and Bow: 1/8-inch in 8 feet-0 inches.
 - 3. Shim panels as necessary to comply with tolerances.

3.4 FINISHING OF GYPSUM BOARD

- A. Apply joint treatment at gypsum board joints; flanges of corner bead, edge trim and penetrations, fastener heads and surface defects in accordance with ASTM C840 or GA 216. Number of coats of treatment shall be as specified above.
- B. Apply joint tape at joints between gypsum boards.
- C. Finish interior gypsum board by applying the number of coats of treatment as specified above. Sand between each coat and after last coat.

- D. Taping
 - 1. Environmental Conditions: Control heating and ventilating during finishing operations to ensure the maintenance of 55 degrees F minimum temperature.
- E. Caulking
 - 1. Caulk openings around pipes, fixtures and other items projecting through gypsum board as specified in Section 079000.
 - 2. Caulk top of fire rated walls and partitions and penetrations through fire rated walls and partitions in accordance with Section 079000.
 - 3. Apply caulking material with exposed surface flush with gypsum board.
- F. Finishing:
 - 1. Finish shall be level 5 for all exposed surfaces.
 - 2. Finish shall be level 2 for all other surfaces.
- G. Finish Painting: As specified in Section 099100.

3.5 FIELD QUALITY CONTROL

- A. Installer shall be present at the Architect's inspection of Work. Touch up as required and directed subsequent to finish application.

3.6 CLEAN UP

- A. Clean all beads, screeds, metal base, metal trim, mechanical and electrical items.
 - 1. Wipe clean, leaving work ready for finish specified under other Sections.
 - 2. As work is completed in each space, clean all rubbish, utensils and surplus materials from the space. Do not allow the accumulation of scraps and debris arising from work of this Section, maintain areas in a neat and safe condition at all times. Leave floors broom clean.
- B. Spillage: In event of spilling or splashing compound onto other surfaces, immediately remove the spilled or splashed material and all traces of the residue to the approval of the Architect.

3.7 PROTECTION

- A. Provide protection to gypsum board construction free from damage or deterioration.

END OF SECTION

SECTION 095100 – ACOUSTICAL CEILINGS

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provision of suspension ceiling systems as shown on project Drawings and as specified herein.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 072116 - Blanket Insulation: Provision of acoustical insulation.
- C. Section 092900 - Gypsum Board: Provision of gypsum board wall surfaces.
- D. Section 133419 – Metal Building System; Provision of anchoring to metal building.
- E. Division 23 - Heating, Ventilating, and Air-Conditioning (HVAC): Provision of mechanical work to be performed above suspended acoustical ceilings.
- F. Division 26 - Electrical: Provision of electrical work to be performed above suspended ceilings.

1.3 REFERENCES

- A. ASTM - American Society for Testing and Materials
 - 1. C636 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
 - 2. E84 - Test Method for Surface Burning Characteristics of Building Materials.

3. E1264 - Classification for Acoustical Ceiling Products.

B. CBC - California Building Code, 2016 Edition

C. UL - Underwriters Laboratories, Inc.

1. FRD - Fire Resistance Directory.

1.4 SYSTEM DESCRIPTION

A. Design Requirements: Architectural reflected ceiling plan drawings shall govern over Mechanical and Electrical Drawings.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's product data completely describing products.

B. Shop Drawings: Show complete ceiling layouts, methods and details of installation, and information required for related work.

C. Samples

1. Acoustical Materials: 1 panel of each type specified.

D. Quality Control Submittals

1. Manufacturer's Instructions: Submit manufacturer's installation instructions.

1.6 QUALITY ASSURANCE

A. Qualifications: Installer shall have completed at least 3 previous projects of similar size and complexity.

B. Regulatory Requirements

1. Fire Resistive Ceilings: Install fire rated ceiling systems in accordance with CBC and UL FRD listing and requirements of agency having jurisdiction.

1.7 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping: Deliver and store packaged products in original containers with seals unbroken and labels intact until time of use.

B. Storage and Protection

1. Keep materials dry by storing off ground; under watertight covers.
2. Immediately before installation, panels shall be stored for sufficient time to stabilize temperature and humidity conditions ambient during installation and anticipated for occupancy.
3. Panel Grilles: Store flat and level in a fully enclosed space. Store panel grilles in the room in which they will be installed for a minimum 72 hours immediately prior to ceiling installation. The temperature and humidity of the room shall closely approximate those conditions that will exist when the building is occupied. Panel grilles must be stored off the floor.

1.8 PROJECT CONDITIONS

- A. Environmental Requirements: Do not begin work until residual moisture has dissipated and comply with the following:
1. Acoustical Ceilings: Maintain uniform temperature of minimum 60 degrees Fahrenheit and maximum of 90 degrees Fahrenheit and humidity of 20 to 40 percent but no more than 90 percent prior to, during and after installation.

1.9 SEQUENCING AND SCHEDULING

- A. Schedule installation of acoustic units after interior wet work is dry.
- B. Coordinate installation of ceilings with mechanical and electrical work.

1.10 MAINTENANCE

- A. Extra Materials: Provide 5 percent extra quantity of each type of acoustical surface installed. Provide in original unbroken containers plainly marked with type and quantity of contents.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Armstrong World Industries, Inc., www.armstrongceilings.com, 1-877-ARMSTRONG.

2.2 MATERIALS

A. AT-1 Suspended Acoustical Ceiling

1. Panels: Armstrong Ultima Square Lay-In panels with moisture resistant wet formed mineral fiber with factory applied vinyl latex paint, mildew resistant, and with the following properties:
 - a. Light Reflectance: Minimum LR 0.87 in accordance with ASTM E1264.
 - b. NRC Range: Up to 0.75
 - c. Surface Burning Characteristics: Class A in accordance with ASTM E84, with flame spread 25 or under.
 - d. Size: See Schedule
 - e. Color: White
 - f. Edge: Square
2. Mechanical Suspension System: Prelude, heavy-duty, exposed grid system for square edge ceiling panels, double-web tees, steel body with exposed surfaces factory painted with baked polyester paint.
 - a. Provide panel centering devices built into each grid member.
 - b. Pull out tension values greater than 300 pounds.
 - c. Color: Blizzard White
 - d. Width: 15/16-inch.

B. AT-2 Ultima Health Zone Panels:

1. Panel Size: 24" x 48"
2. Panel Thickness: 3/4"
3. Material: Wet-formed mineral fiber with DuraBrite acoustically transparent, water-repellent membrane
4. Surface Finish: DuraBrite with factory-applied latex paint
5. Color: White or as approved by the Architect per Section 013300, Submittals.

6. Surface Texture: Fissured and scored 12" x 12" squares
 7. Edge Profile: Angled Tegular
 8. Insulation Values:
 - a. R Factor – 2.2 (BTU units)
 - b. R Factor – 0.39 (Watts units)
 9. Acoustics Ratings:
 - a. NRC Range: 0.75
 - b. CAC Range: 35
 10. Light Reflectance: 0.86
 11. Sag Resistance: HumiGuard Plus
 12. Anti-Microbial: BioBlock Plus
 13. Fire Resistance: Class A
 14. Recycled Content: 28-39%
 15. Dimensional Stability: HumiGuard Plus with BioBlock
- C. Suspended Acoustical Clouds AC-1 through AC-5
1. Panels: Armstrong Calla Colorations Square Lay-In panels with moisture resistant wet formed mineral fiber with factory applied vinyl latex paint, mildew resistant, and with the following properties:
 - a. Light Reflectance: Minimum LR 0.86 in accordance with ASTM E1264.
 - b. NRC Range: Up to 0.85
 - c. Surface Burning Characteristics: Class A in accordance with ASTM E84, with flame spread 25 or under.
 - d. Size: See Schedule
 - e. Color: See Schedule

2. Edge: Square

D. Mechanical Suspension System: Prelude, heavy-duty, exposed grid system for square edge ceiling panels, double-web tees, steel body with exposed surfaces factory painted with baked polyester paint.

- a. Provide Axiom trim:
 - i. Size: 4" high
 - ii. Color: Match suspension system
 - iii. Shape: See Schedule
 - iv. Size: See Schedule
- a. Provide panel centering devices built into each grid member.
- b. Pull out tension values greater than 300 pounds.
- c. Color: Match acoustic panel, see schedule.
- d. Width: 15/16-inch.

E. Fasteners and Attachments

- 1. 12 gauge (minimum) hanger wires may be used for up to and including 4 feet by 4 feet grid spacing and shall be attached to main runners.
- 2. Provide 12 gauge hanger wires at the ends of all main and cross runners within 8 inches of the support or within 1/4 of the length of the end tee, whichever is least, for the perimeter of the ceiling area. End connections for runners that are designed and detailed to resist the applied vertical and horizontal forces may be used in lieu of the 12 gauge hanger wires, subject to Division of the State Architect (DSA) review and approval.
- 3. Provide trapeze or other supplementary support members at obstructions to typical hanger spacing. Provide additional hangers, struts or braces as required at all ceiling breaks, soffits or discontinuous areas. Hanger wires that are more than 1 in 6 out of plumb are to have counter-sloping wires.
- 4. Ceiling grid members may be attached to not more than 2 adjacent walls. Ceiling grid members shall be at least 1/2-inch free of other walls. If

walls run diagonally to ceiling grid system runners, one end of main and cross runners should be free, and a minimum of 1/2-inch clear of wall.

5. At the perimeter of the ceiling area where main or cross runners are not connected to the adjacent wall, provide interconnection between the runners at the free end to prevent lateral spreading. A metal strut or a 16 gauge wire with a positive mechanical connection to the runner may be used. Where the perpendicular distance from the wall to the first parallel runner is 12 inches or less, this interlock is not required.
6. Provide bracing assemblies consisting of a compression strut and 4 each 12 gauge splayed bracing wires oriented 90 degrees from each other at the following spacing:
 - a. Place bracing assemblies at a spacing not more than 12 inches by 12 inches on center.
 - b. Provide bracing assemblies at locations not more than one half the spacings given above, from each perimeter wall and at the edge of vertical ceiling offsets. The slope of these wires shall not exceed 45 degrees from the plane of the ceiling and shall be taut. Splices in bracing wires are not permitted.
 - c. Suspended acoustical ceiling systems with a ceiling area of 144 square feet or less, and fire rated suspended acoustical ceiling systems with a ceiling area of 96 square feet or less, surrounded by walls which connect directly to the structure above, do not require bracing assemblies when attached to 2 adjacent walls.

F. Accessories

1. Light Fixture Protection and Hold Down Clips: Provide light fixture protection panels, fasteners and hold down clips if required by UL FRD listing, manufacturer's standard types.
2. Edge Moldings: Profiles as indicated. Factory finish to match exposed suspension system components.
3. Aluminum Cross Baffles: Provide white aluminum cross baffle panels, 0.018- to 0.020-inch thick. Provide 12 inch wide by 48 inch long by 1 inch high panels. Mitre comers.
 - a. Product: Ecolite, (509) 922-8888, "BFL-IOO"; ALP Products, "CB Series", or equal.
4. Interior Ceiling Closures: Sheet steel or aluminum formed and bent to

profiles indicated. Prefinished white. All edges and ends hemmed or returned. All splices butt with concealed mechanical connectors. Field verify dimensions prior to fabrication.

2.3 SCHEDULE

Symbol	Cloud Size	Series	Size	Color
AT-1	-	Ultima Lay-In	24" x 48"	White
		Prelude	15/16"	White
AT-2	-	Ultima Health Zone Panels	24" x 48"	White
		Prelude	15/16"	White
AC-1	14' square	Cala Colorations	24" x 24"	2824TG Tangerine
		Prelude	15/16"	White
AC-2	12' square	Cala Colorations	24" x 24"	2824RE Reef
		Prelude	15/16"	White
AC-3	10' square	Cala Colorations	24" x 24"	2824TG Tangerine
		Prelude	15/16"	White
AC-4	10' circle	Cala Colorations	24" x 24"	2824KW Kiwi
		Prelude	15/16"	White
AC-5	10' circle	Cala Colorations	24" x 24"	2824RE Reef
		Prelude	15/16"	White

3.0 EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive acoustical treatment and verify that:
1. Installation of building components located in ceiling plenum is complete.
 2. Spacing, direction and details of grid members and supports to accommodate installation of light fixtures, diffusers and other ceiling located items are correct.
 3. Areas are clean and free of materials or rubble that could damage acoustical surfaces.
- B. Do not start work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Suspended Ceiling Systems

1. Install acoustical material and suspension system, including necessary hangers and other supporting hardware in accordance with manufacturer's instructions and ASTM C636.
2. Lay work out symmetrically about centers of rooms and provide symmetrical borders not less than half size of tile specified unless noted otherwise on the Drawings.
3. Make penetrations through ceiling panels in such a manner to ensure tight fit and neat appearance. Center penetrations in tile unless otherwise noted.

B. Suspension System

1. Fasten hanger wires with not less than 3 tight turns. Fasten bracing wires with 4 tight turns. Make all tight turns within a distance of 1-1/2 inches. Hanger or bracing wire anchors to the structure should be installed in such a manner that the direction of the wire aligns as closely as possible with the direction of the forces acting on the wire.
 - a. Wire turns made by machine where both strands have been deformed or bent in wrapping can waive the 1-1/2 inch requirement, but the number of turns should be maintained, and be as tight as possible.
2. Separate all ceiling hanging and bracing wires at least 6 inches from all unbraced ducts, pipes, conduit, etc. It is acceptable to attach lightweight items, such as single electrical conduit not exceeding 3/4-inch nominal diameter, to hanger wires.
3. When drilled-in concrete anchors or shot-in anchors are used in reinforced concrete for hanger wires, 1 out of 10 must be field tested for 200 pounds in tension. When drilled-in concrete anchors are used for bracing wires, 1 out of 2 must be field tested for 440 pounds in tension. Shot-in anchors in concrete are not permitted for bracing wires. If any shot-in or drilled-in anchor fails, see CBC, Section 1923A.3.5.
4. Attach all light fixtures and ceiling mounted air terminals or services, to the ceiling grid runners to resist a horizontal force equal to the weight of the fixtures. Screws or approved fasteners are required.
5. Flush or recessed light fixtures and air terminals or services, weighing less than 56 pounds, may be supported directly on the runners of a heavy duty grid system but, in addition, they must have a minimum of 2 each

12 gauge slack safety wires attached to the fixture at diagonal comers and anchored to the structure above. All 4 feet by 4 feet fixtures shall have slack safety wires at each comer.

- a. All flush or recessed light fixtures and air terminals or services weighing 56 pounds or more must be independently supported by not less than 4 taut 12 gauge wires each attached to the fixture and to the structure above regardless of the type of ceiling grid system used.
 - b. The 4 taut 12 gauge wires, including their attachment to the structure above, must be capable of supporting 4 times the weight of the unit.
6. All fixtures and air terminals or services supported on intermediate duty grid systems must be independently supported by not less than 4 taut 12 gauge wires each attached to the fixture or terminal, and to the structure above.
 7. Support surface mounted light fixtures by at least 2 positive devices which surround the ceiling runner and which are each supported from the structure above by a 12 gauge wire. Spring clips or clamps that connect only to the runner are not acceptable.
 - a. Provide additional supports when light fixtures are 8 feet or longer.
 8. Support pendant mounted light fixtures directly from the structure above with hanger wires or cables passing through each pendant hanger and capable of supporting 4 times the weight of the fixture. A bracing assembly is required where the pendant hanger penetrates to the ceiling. Special details are required to attach the pendant hanger to the bracing assembly to transmit horizontal forces.
 9. Level grid assembly in each area after installation of mechanical and electrical equipment within 1/8-inch in 12 inches or conforming to slope as appropriate to area of installation.

C. Perimeter Trim Members

1. Install at intersections with perpendicular surfaces as shown.
2. Lap joints where trim pieces meet at wall angles. Do not bend trim around corners.

3.3 FIELD QUALITY CONTROL

- A. Acoustical Ceiling Connection Devices; Test devices for capability to support the following loads:
 - 1. Hanger Wires: 200 pounds in accordance with requirements of CBC.
 - 2. Lateral Force Bracing Wires: 440 pounds.

3.4 CLEAN UP AND ADJUSTING

- A. Remove damaged or soiled material and replace with new prior to the Owner's acceptance of Project.

3.5 PROTECTION

- A. Protect acoustical treatment installation from damage during remainder of construction.

END OF SECTION

SECTION 096500 – RESILIENT FLOORING

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install resilient polyester composition floor tile, underlayment and all accessories where shown on Drawings and as specified herein.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 033000 - Cast-In-Place Concrete: Provision of cast-in-place concrete.
- C. Section 033923 – Membrane Concrete Curing
- D. Section 07900 - Sealants and Caulking: Provision of caulks and sealants.
- E. Section 092900 - Gypsum Board: Provision of gypsum board wall surface.
- F. Section 096513 - Rubber Base

1.3 REFERENCES

- A. Armstrong Flooring Technical Manuals
 - 1. Armstrong Flooring Guaranteed Installation Systems manual, F-5061
 - 2. Armstrong Flooring Maintenance Recommendations and Procedures manual, F-8663
- B. ASTM - American Society for Testing and Materials
 - 1. ASTM E 648 Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 - 2. ASTM E 662 Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials

3. ASTM F 710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
 4. ASTM F 1066 Standard Specification for Vinyl Composition Tile
 5. ASTM F 1482, Standard Guide to Wood Underlayment Products Available for Use Under Resilient Flooring
 6. ASTM F 1861 Standard Specification for Resilient Wall Base
 7. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
 8. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
- B. NFPA – National Fire Protection Association
1. NFPA 253 Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
 2. NFPA 258 Standard Test Method for Measuring the Smoke Generated by Solid Materials

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each type of product specified.
- B. Samples: Submit samples for initial selection purposes in form of manufacturer's color charts consisting of actual tiles or sections of tiles and bases showing full range of colors and patterns available for each different product indicated. Include interior and exterior premolded corner samples.
- C. Quality Control Submittals
1. Certificates: Submit certification by resilient tile manufacturer that products supplied for tile installation comply with local regulations controlling use of volatile organic compounds (VOC's).
 2. Installer certificates signed by floor covering manufacturer certifying that Installers comply with requirements specified under "Quality Assurance" article.
- D. Contract Closeout Submittals
1. Operation and Maintenance: Submit maintenance data for resilient floor tile.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Acceptance at Site: Deliver tiles and installation accessories to Project site in original manufacturer's unopened cartons and containers each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Storage and Protection
 - 1. Store flooring materials in dry spaces protected from the weather with ambient temperatures maintained between 50 degrees F and 90 degrees Fahrenheit.
 - 2. Store tiles on flat surfaces. Move tiles and installation accessories into spaces where they will be installed at least 48 hours in advance of installation.

1.6 PROJECT CONDITIONS

- A. Environmental Requirements
 - 1. Maintain a minimum temperature of 70 degrees Fahrenheit in spaces to receive resilient flooring materials for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. After this period, maintain a temperature of not less than 55 degrees Fahrenheit.
 - 2. Do not install resilient flooring materials until they are at the same temperature as the space where they are to be installed.
 - 3. Close spaces to traffic during resilient flooring materials installation.

1.7 SEQUENCING AND SCHEDULING

- A. Install resilient flooring materials and accessories after other finishing operations, including painting, have been completed. Close spaces to traffic during the installation of the flooring.
- B. Sequence installing products specified in this Section with other construction to minimize possibility of damage and soiling during remainder of construction period.
- C. Do not install resilient flooring materials over concrete slabs until the slabs have cured and are sufficiently dry to bond with adhesive as determined by tile manufacturer's recommended bond and moisture tests.

1.8 MAINTENANCE

- A. Extra Materials: Deliver extra materials to the Owner. Furnish extra materials matching products installed as described below, packaged with protective covering

for storage and identified with labels clearly describing contents.

1. Furnish 1 box of each class, wearing surface, color, pattern and size of resilient floor tile installed.
2. Furnish 10 percent of linear feet in roll form of each different composition, wearing surface, color, and pattern of linoleum floor covering, and resilient wall base installed.

1.9 WARRANTY

- A. Resilient Flooring: Submit a written warranty executed by the manufacturer, agreeing to repair or replace resilient flooring that fails within the warranty period.
- B. Limited warranty period: 10 years
- C. Limited Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.
- D. For the Limited Warranty to be valid, this product is required to be installed using the appropriate Armstrong Flooring Guaranteed Installation System. Product installed not using the specific instructions from the Guaranteed Installation System will void the warranty.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers
 1. Resilient Tile: Armstrong, or approved equal.
 4. Underlayment: Ardex, or approved equal.

2.2 RESILIENT TILE

- A. Provide Vinyl Composition Tile: Standard Excelon® with Diamond 10® Technology Coating Imperial® Texture Tile Flooring manufactured by Armstrong Flooring, Inc
- B. Provide Vinyl Composition Tile: Premium Excelon® Raffia Stream with Diamond 10® Technology Coating Tile Flooring manufactured by Armstrong Flooring, Inc
 1. Vinyl composition tile shall conform to the requirements of ASTM F 1066, "Standard Specification Vinyl Composition Floor Tile", Class 2, through-pattern

2. Wearing Surface: Smooth.
3. Thickness: 1/8-inch.
4. Size: 12 inches by 12 inches.
5. Color and Pattern: See schedule

2.3 INSTALLATION ACCESSORIES

- A. Concrete Slab Primer: Nonstaining type as recommended by flooring manufacturer.
- B. Trowelable Underlayments and Patching Compounds: Latex modified, Portland cement based formulation provided or approved by resilient flooring manufacturer for applications indicated.
- C. Adhesives (Cements); Waterproof type recommended by tile manufacturer to suit resilient floor tile products and substrate conditions indicated. Adhesives shall be compatible with vapor emission treatment systems specified in Section 099725.
- D. Caulking: Acrylic latex silicon caulk as specified in Section 079200. E. Waterproof Adhesive; As manufactured by Master Builders, “Concresive Paste LPL”, or equal.

2.4 UNDERLAYMENT

- A. Portland cement based, latex modified, feather edge, trowelable material. Add pea gravel in 1:1 by volume as required. Product: Ardex, “SD-F Featheredge Finish”, or approved equal.

2.5 SCHEDULE

Reference #	Series	Color	Pattern
VCT-1	Armstrong, Premium Excelon Raffia Stream with Diamond 10 Technology Coating	Z5930 Opal	Ashlar
VCT-2	Armstrong, Standard Excelon Imperial Texture with Diamond 10 Technology Coating	Z7510 Kickin' Kiwi	Monolithic
VCT-3	Armstrong, Standard Excelon Imperial Texture with Diamond 10 Technology Coating	Z7512 Bikini Blue	Monolithic
VCT-4	Armstrong, Standard	Z7516 Screamin'	Monolithic

	Excelon Imperial Texture with Diamond 10 Technology Coating	Pumpkin	
VCT-5	Armstrong, Standard Excelon Imperial Texture with Diamond 10 Technology Coating	Z1812 Lemon Yellow	Monolithic
Note: Verify location, type and size with drawings			

3.0 EXECUTION

3.1 EXAMINATION

- A. General: Examine areas where installation of products specified in this Section will occur, with installer present, to verify that substrates and conditions are satisfactory for tile installation and comply with manufacturer's requirements and those specified in this Section.
- B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F710 and the following:
 - 1. Slab substrates are dry and free of curing compounds, sealers, hardeners and other materials whose presence would interfere with bonding of adhesive. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by tile manufacturer.
 - 2. Subfloors are free of cracks, ridges, depressions, scale and foreign deposits of any kind.

3.2 PREPARATION

- A. General: Comply with manufacturers' installation specifications to prepare substrates indicated to receive resilient flooring accessories.
- B. Use trowelable leveling and patching compounds per manufacturer's directions to fill cracks, holes and depressions in substrates.
- C. Remove coatings, including curing compounds, and other substances that are incompatible with flooring adhesives and that contain soap, wax, oil or silicone, by using a terrazzo or concrete grinder, a drum sander, or a polishing machine equipped with a heavy-duty wire brush.
- D. Broom or vacuum clean substrates to be covered by tiles immediately before flooring installation. Following cleaning, examine substrates for moisture, alkaline salts, carbonation or dust.

- E. The General Contractor shall be responsible for acceptability of moisture emission of concrete.
 - 1. Before installing resilient flooring, concrete slab shall be tested as specified in Section 099725 for moisture emission. The test shall be conducted around the perimeter of each room, at columns and where moisture may be evident. A diagram of the areas showing the locations and results of each calcium chloride test shall be submitted to the Architect. At each area where the moisture emission exceeds 3.5 pounds per 1,000 square feet per 24 hours, a sealant shall be applied as specified in Section 099725.
- F. Apply concrete slab primer, if recommended by flooring manufacturer, prior to applying adhesive. Apply according to manufacturer's directions.

3.3 INSTALLATION

- A. General: Comply with manufacturers' installation directions and other requirements indicated that are applicable to each type of installation included in Project.
 - 1. Apply waterproof adhesive in accordance with manufacturer's instructions.

3.4 RESILIENT TILE INSTALLATION

- A. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths at perimeter that equal less than one-half of a tile. Install tiles square with room axis, unless otherwise indicated.
- B. Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged, if so numbered. Cut tiles neatly around all fixtures. Discard broken, cracked, chipped, or deformed tiles.
 - 1. Lay tiles as indicated.
 - 2. Where no pattern is indicated, lay tile in checker board pattern with grain in alternate directions.
- C. Where cabinets and other items are indicated for installing on top of finished tile floor, install tile before these items are installed.
- D. Scribe, cut, and fit tiles to butt tightly to vertical surfaces, permanent fixtures, built-in furniture including, pipes, outlets, edgings, thresholds and nosings.
- E. Extend tiles into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent marking device.

- G. Adhere tiles to flooring substrates without producing open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, or other surface imperfections in completed tile installation.
- H. Use full spread of adhesive applied to substrate in compliance with tile manufacturer's directions including those for trowel notching, adhesive mixing, and adhesive open and working times.
- I. Hand roll tiles where required by tile manufacturer.

3.5 CLEAN UP AND PROTECTION

- A. Perform the following operations immediately after completing installation:
 - 1. Remove visible adhesive and other surface blemishes using cleaner recommended by manufacturers.
 - 2. Sweep or vacuum floor thoroughly.
 - 3. Do not wash floor until after time period recommended by manufacturer.
 - 4. Damp-mop resilient flooring and accessories to remove black marks and soil.
- B. Protect flooring against mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods indicated or recommended by tile manufacturer.
 - 1. Apply protective floor polish as recommended by manufacturer.
 - 2. Cover tiles with undyed, untreated building paper until inspection for Substantial Completion.
 - 3. Do not move heavy and sharp objects directly over flooring materials. Place plywood or hardboard panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.
- C. Clean products specified in this Section not more than 4 days prior to dates scheduled for inspections intended to establish date of Substantial Completion in each area of Project. Clean products using method recommended by manufacturer.
 - 1. Strip and reapply protective floor polish as recommended by manufacturer.

END OF SECTION

SECTION 096800 – CARPET TILE

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned, or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install carpet and all accessories where shown on Drawings and as specified herein.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 072600, Surface Applied Vapor Retarder
- C. Division 9 - Finishes

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. 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
 - 2. ASTM D1667-Standard Specification for Flexible Cellular Materials-Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam)
 - 3. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials
 - 4. ASTM D5116 - Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products
 - 5. ASTM D5417 - Standard Practice for Operation of the Vettermann Drum Tester
 - 6. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Material.

7. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 8. ASTM E662 -Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
 9. ASTM F1861 - Standard Specification for Resilient Wall Base
- B. American Association of Textile Chemists and Colorists (AATCC):
1. AATCC 20 - Fiber Analysis: Qualitative
 2. AATCC 134 - Electrostatic Propensity of Carpets
- C. Carpet and Rug Institute (CRI):
1. CRI TM 102 - Fluorochemical Finishes
- D. National Fire Protection Association (NFPA):
1. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source

1.4 SUBMITTALS

- A. Comply with provisions of Section 013300, Submittal Procedures.
- B. Shop Drawings: Showing the extent of carpet, seam direction of carpet, location of molding and edge strips, and accessories shall be submitted to Architect for approval prior to installation. Check pattern match, if any, for matching during installation and possible waste factors in ordering required amounts. Indicate columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet. Copy of approved shop drawings to be available on job site during installation.

1.5 DELIVERY, STORAGE, & HANDLING

- A. Accept delivery of materials to the site in manufacturer's original packaging listing manufacturer's name, product name, identification number, and related information.
- B. Store in a dry location, between 60 degrees F and 80 degrees F and a relative humidity below 65%. Protect from damage and soiling.
- C. Make stored materials available for inspection by the Owner's representative.
- D. Store materials in area of installation for minimum period of 48 hours prior to installation.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:

1. Flooring contractor must be certified by the carpet manufacturer prior to bid.
2. Flooring contractor to be a specialty contractor normally engaged in this type of work and shall have prior experience in the installation of these types of materials of a minimum of 5 years.
3. Certify payment of Prevailing Wage Rates to the installers.
4. Flooring contractor possessing Contract for the carpet installation shall not sub-contract the labor without written approval of the Project Manager.
5. Flooring contractor will be responsible for proper product installation, including floor testing and preparation, as specified by the carpet manufacturer and Part 1.6, Project Conditions herein.
6. Flooring contractor to provide the Owner with a written installation warranty that guarantees the completed installation to be free from defects in materials and workmanship for a period of one year after job completion.

1.7 PROJECT CONDITIONS

- A. Sub-floor preparation is to include all required work to prepare the existing floor for installation of the product as specified in this Section and manufacturer's installation instructions.
- B. The maximum amount of moisture evacuation from the floor is 3.0 pounds per 1,000 square feet in 24 hours. The acceptable pH level of the substrate is between 7.0 and 9.0. Flooring contractor is responsible for floor testing.
- C. All material used in sub-floor preparation and repair shall be recommended by the carpet manufacturer and shall be chemically and physically compatible with the carpet system being bid.
- D. Maintain minimum 65 degrees F ambient temperature and 65% Relative Humidity for 72 hours prior to, during, and 48 hours after installation.
- E. Do not install carpet until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

1.8 EXCESS MATERIALS

- A. Provide additional 5% of each type, color, and pattern furnished;

1.9 CARPET WARRANTY

- A. Warranty to be sole source responsibility of the Manufacturer. Second source warranties and warranties that involve parties other than the carpet manufacturer are unacceptable.
- B. If the product fails to perform as warranted when properly installed and maintained, the affected area will be repaired or replaced at the discretion of the Manufacturer.
- C. Chair Pads are not required for carpet warranty coverage.
- D. Warranty shall not exclude carpet product installed on stairs provided it is properly installed and maintained.
- E. Warranty shall be for a specifically defined non-prorated period of twenty years. "Lifetime" warranties are not acceptable.
- F. The non-prorated twenty-year warranty shall cover against and specifically define the following:
 - 1. Excessive Surface Wear: More than 15% loss of pile fiber weight
 - 2. Excessive Static Electricity: Warrant that carpet will give protection from static discharges in excess of 3.0 kV when tested under the Standard Shuffle Test method (at 70 degrees F and 20% R. H.) during Life of Carpet. (per AATCC 134)
 - 3. Resiliency Loss of the Backing: More than 10% loss of backing resiliency
 - 4. Backing Delamination: Warrant that secondary backing of carpet will not delaminate during Life of Carpet.
 - 5. Edge Ravel: Warrant that under normal use, carpet will not edge ravel at seams or edges during Life of Carpet.
 - 6. Zippering.
 - 7. Tuft Bind warranty in lieu of edge ravel and zippering is not acceptable. Warrant that carpet will have average face yarn tuft bind of twenty pounds STM D-1-335-67 method. This portion of warranty must protect against insufficient tuft bind, whether the carpet is dry or wet (as it might be during steam cleaning, hot water extraction, or as a result of a broken pipe or flood).

8. Adhesive: Carpet manufacturer shall fully guarantee substrate and adhesive performance for the Life of Carpet installation, provided adhesive is made by Carpet manufacturer. Use of Third party warranties are not acceptable. Use of an adhesive that has not been approved by Carpet manufacturer will void warranty.
9. Stain Resistance: 10 year Lightfastness and Atmospheric Contaminant Warranty, refer to Part 2.3Di of this Section.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Shaw Contract; www.shawcontract.com

2.2 MATERIALS

- A. Carpet Tile: Modular tiles with recycled or reprocessed re-used materials.
 1. Construction: Multi-Level Patterned Loop.
 2. Pile Units per Inch: 9.8
 3. Pile Height Average (ASTM D418, Section 12): 0.077-inch
 4. Static Control: Less than 3.5 KV at 70 degrees F and 20 percent RH.
 5. Radiant Panel/Flammability: Class 1/Methenamine Pill Test
 6. Smoke Density: Per ASTM E 662 <450.
 7. Warranties: Minimum of non-prorated, 15 year warranty covering material and labor against edge ravel, backing delamination, wet or dry, static protection, face yarn loss no more than 10 percent or 20 lb. tuft bind.
 8. Odor Emissions: Meet CRI Green Label standards.
 9. Warranty: Lifetime, commercial limited warranty
 10. Carpet shall economically maximize the following appearance retention characteristics:
 - a. Minimize crushing and matting.
 - b. Manage dry soil concerns and ease of maintenance.

- c. Manage staining.
- d. Eliminate seam failure and unravelling.
- e. Eliminate moisture exposure concerns.
- f. Minimize loss of coloration and fading.

B. Carpet Types:

- 1. Carpet Tile CT-1: Contactor provided and installed.
 - a. Manufacturer: Shaw Contract
 - b. Series/Color/Pattern: See Schedule
 - c. Gauge: 1/12
 - d. Stitches per inch: 9.0
 - e. Size: See Schedule
 - f. Fiber System: Eco Solution Q SD Nylon
 - g. Dye method: Solution dyed
 - h. Stain/Soil Protection: S.S.P. Shaw Soil Protection

C. Adhesive System: Manufacturer's microencapsulated tackifier applied to 94 percent of backing during manufacturing. Adhesive system shall be compatible with vapor emission treatment system specified in Section 018119.

2.3 ACCESSORIES

- A. Carpet Transition: Burke 152 Carpet to Resilient Transition. Transitions 1/4" glue down carpet to 1/8" tile.
 - 1. Finish: Match rubber base
- B. Seaming Cement Hot-melt adhesive tape or similar product recommended by carpet manufacturer for taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.
- C. Adhesives: As recommended by carpet manufacturer, or if acceptable to manufacturer use low pressure sensitive, releasable low VOC water based adhesive, as manufactured by W. F. Taylor - Envirotech, "Healthguard", (800) 397- 4583, or

approved equal. Adhesives shall be compatible with vapor emission treatment systems specified in Section 018119.

2.4 CARPET SCHEDULE

Carpet Tiles	Series	Size	Color	Pattern
CT-1	Places, Sea Tile 5T172	24" x 24"	Adventure 72481	Ashlar

3.0 EXECUTION

3.1 EXAMINATION/PREPARATION

- A. Prepare sub-floor to comply with criteria established in Manufacturer's installation instructions. Use only preparation materials that are acceptable to the Manufacturer.
- B. Do not scale the Architect's drawings or calculate sizes from dimensions shown. Measure each space to receive carpeting as a basis of supplying, cutting, and seaming the carpet
- C. Meet with General Contractor several days prior to installation. Discuss various areas of responsibility so that installation and acceptance of floor will be a smooth transition between trades, preventing costly down-time. Discuss these subjects:
 1. Remove all deleterious substances from substrate(s) that would interfere with or be harmful to the installation. (i.e., floor wax)
 2. Remove sub-floor ridges and bumps. Fill cracks, joints, holes, and other defects.
 3. Verify that sub-floor is smooth and flat within specified tolerances and ready to receive carpet.
 4. Verify that substrate surface is dust-free and free of substances that would impair bonding of product to the floor.
 5. Verify that concrete surfaces are ready for installation by conducting moisture and pH testing. Results must be within limits recommended by Manufacturer. Moisture Test requires the following:
 - a. A concrete nail must be driven into floor surface no more than 1/2".
 - b. Remove nail and place small amount of anhydrous calcium chloride or calcium sulfate crystals over hole.

- c. Cover crystals and the hole with a piece of flat glass and seal edges with waterproof tape or putty. As concrete pourings vary, repeat this test every 1,500 square feet. (139.35 M2) Leave glass plate in place for 72 hours.
 - d. Any color change in crystals indicates the presence of moisture and must be reported to General Contractor.
 - e. An electronic moisture meter may be used to measure moisture. The percent total moisture should not exceed 4-5%.
6. Verify floor temperature. Temperature should remain at 65 degrees F for 24 hours before and 40 hours after the installation. Take temperature readings from thermometer placed on the floor. Repeat in scattered areas.
 7. Verify that a carpet installer will return 5 days after installation to monitor and remove any carpet buckles that may occur.
 8. Verify porosity of floor. Pour a cup of water on floor, repeat in scattered areas. If water breaks into beads or remains on surface, floor is relatively non-absorbent and adhesive will dry at its normal rate. If water is absorbed rapidly, the floor is very porous and adhesive will dry too quickly. In the event of very porous floor, damp mopping prior to spreading adhesive will slow down absorption rate of floor.
 9. There will be no exceptions to the provisions stated in the Manufacturer's installation instructions.

3.2 INSTALLATION – GENERAL

- A. Install product in accordance with manufacturer's installation instructions.
- B. Pallet and Box Sequencing - It is very important to install carpet tiles in the order they were manufactured. This is easily accomplished by selecting pallets in sequential order and following the numbers located on each carton of tiles to ensure the most uniform look. Typically, an installation will begin with the lowest carton numbers and progress through the highest numbers until the project is complete.
- C. Adhesive Application
 1. The adhesive must be applied in a FULL SPREAD – NOT grid.
 2. The spread rate for roll on application is 35 to 40 yards per gallon when using a 3/4" nap roller. Ensure the proper application amount of adhesive to the subfloor. Prior to installation, mark off a small area of the subfloor and determine the adhesive spread rate. This will allow you to determine the

proper coverage level and amount of pressure to apply to the roller during installation.

3. On smooth surfaces, be careful not to apply too little adhesive. Just because a surface is smooth and/or sealed, it still requires a proper coating of adhesive.
4. Allow the adhesive to dry to a clear and tacky state. Tiles must be installed immediately after adhesive has dried. To determine if the adhesive is dry, press finger into adhesive. When dry, adhesive must not transfer to finger.

IMPORTANT: Set-up time is approximately 45 to 90 minutes depending on the climate. & humidity. Use of blower fans will speed drying time.

5. Roll Floor with 75 to 100 pound Roller
- C. Install carpet tight and flat on sub-floor, with a uniform appearance.
- D. Recommended Adhesives:
1. Manufacturer recommended pressure sensitive adhesive. Coverage will depend on type of substrate and trowel size. Installer is responsible for determining exact spread rate, however, in most conditions a spread rate of 10-12 square yards per gallon is required.

3.4 CLEAN UP & PROTECTION

- A. Remove all debris resulting from installation, including removal of excess adhesive and/or seam sealer from floor and wall surfaces without incurring damage.
- B. All rubbish, wrappings, debris, trimmings, etc., to be removed from site and disposed of properly.
- C. Clean and vacuum carpet surfaces using a beater brush/bar commercial vacuum. Remove spots with dry cleaning method (not steam) and leave areas ready for use. After each area of carpet is installed, protect from soiling and damage by other trades.

END OF SECTION

SECTION 096810 – RUBBER BASE

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned, or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install base and accessories where shown on Drawings and as specified herein.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Division 9 – Finishes

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. ASTM D5116 - Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products
 - 2. ASTM D5417 - Standard Practice for Operation of the Vettermann Drum Tester
 - 3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Material.
 - 4. ASTM E662 -Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
 - 5. ASTM F1861 - Standard Specification for Resilient Wall Base
 - 6. ASTM D 2240 - 85 Shore A

1.4 SUBMITTALS

- A. Comply with provisions of Section 013300, Submittal Procedures.

- B. Shop Drawings: Showing the location of molding and edge strips, and accessories shall be submitted to Architect for approval prior to installation. Copy of approved shop drawings to be available on job site during installation.
- C. Product Data: Provide data on specified products, describing physical and performance characteristics, sizes, patterns, and method of installation.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.
- E. Maintenance Data: Include maintenance procedures manual, recommendations for maintenance materials and equipment, and suggested schedule for cleaning.
- F. Certifications: Manufacturer to submit copies of the following independent laboratory reports showing compliance with requirements per these methods outlined in Part 2 of this Section. Submitted results shall represent average results for production goods of the specified style.
 - 1. ASTM E648: Critical Radiant Flux- Class 1
 - 2. ASTM E662: Smoke Density
 - 3. ASTM D3936: Delamination
 - 4. Other from methods specified in Part 2

1.5 DELIVERY, STORAGE, & HANDLING

- A. Deliver materials to the site in manufacturer's original packaging listing manufacturer's name, product name, identification number, and related information.
- B. Store in a dry location, between 60 degrees F and 80 degrees F and a relative humidity below 65%. Protect from damage and soiling.
- C. Make stored materials available for inspection by the Owner's representative.
- D. Store materials in area of installation for minimum period of 48 hours prior to installation.

1.6 PROJECT CONDITIONS

- A. Maintain minimum 65 degrees F ambient temperature and 65% Relative Humidity for 72 hours prior to, during, and 48 hours after installation.
- B. Do not install base until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete and ambient temperature and humidity conditions are and will be continuously maintained at

values near those indicated for final occupancy.

1.7 EXCESS MATERIALS

- A. Provide additional 5% of each type, color, and pattern furnished; product to be rolled and bound. Coordinate storage location with the Owner.
- B. Deliver all unused base and large scraps to the Owner for "attic stock." Dispose of scraps less than 8" in length.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Base: Burke Flooring Products, 2250 S. 10th St., San Jose, CA 95112, 1-800-447-8442. www.burkeflooring.com

2.2 MATERIALS

A. Rubber Wall Base:

- 1. 1/8" Molded Rubber Wall base Type TS.
- 2. Type & Thickness: 1/8" coved base
 - a. Height: 4"
 - b. Length: 4 feet
 - c. Vulcanized thermoset rubber; 1/8 inch thick, satin finish.
 - d. Color: See Schedule
 - e. Substrate adhesives pursuant to manufacturer's recommendations.
 - f. Conformance:
 - 1) ASTM F1861-98, Type TS, Group 1, Styles A & B.
 - 2) FS SS-W-40a, Type I, Styles A & B.
 - 3) ASTM E84 > Class B rating with smoke density of 150-200.

B. Accessories:

- 1. Materials recommended by manufacturer(s) for patching, priming, chemically welding the seams, etc.

2. Adhesives: Products to be supplied with a pre-cured, mill-applied or other "dry" adhesive system when available. Otherwise, adhesive should be full spread, extremely low VOC in compliance with CRI Indoor Air Quality Adhesive Testing Program requirements, compatible with materials being adhered, as recommended by the Manufacturer.
3. Base and Transition Strips: As specified in applicable Sections.

2.3 SCHEDULE

Reference #	Series	Color
RB-1	Burke TS	208 Light Gray
Note: Verify location, type and size with drawings		

3.0 EXECUTION

3.1 EXAMINATION/PREPARATION

- A. Do not scale the Architect's drawings or calculate sizes from dimensions shown. Measure each space to receive base as a basis of supplying and cutting.
- B. Meet with General Contractor several days prior to installation. Discuss various areas of responsibility so that installation and acceptance of base will be a smooth transition between trades, preventing costly down-time. Discuss these subjects:
 1. Remove all deleterious substances from substrate(s) that would interfere with or be harmful to the installation. (i.e., floor wax)
 2. Fill cracks, joints, holes, and other defects.
 3. Verify that substrate surface is dust-free and free of substances that would impair bonding of product.
 4. There will be no exceptions to the provisions stated in the Manufacturer's installation instructions.

3.2 INSTALLATION – GENERAL

- A. Install product in accordance with manufacturer's installation instructions.
- B. Keep materials and adhesives at 65° -80°F for 24 hours before, during, and after installation. Surface to receive Burke Base must be clean, dry and free of any foreign substances.
- C. NOTE: For base installations on any non-porous surfaces, a co-adhesive method of installation applied to both surfaces with contact bond adhesive should be used. Vinyl

wall covering must be cut up to the height of wall base or just below top of base for proper base installation.

- D. Wall areas to receive the base must be completely clean, dry, smooth, and free of oil, grease, rust, paint, varnish, shellac, or any other foreign substances. Cracks, holes, or major wall imperfections should be filled with latex underlayment.
- E. All coiled wall base shall be unrolled and allowed to lay flat for a period of at least 24 hours at 65°F prior to installation. Resilient wall base shall be rolled, with a J-hand roller, after installation, to ensure proper bonding.
- F. On dry, porous, absorbent surfaces, the base should be cemented with Burke BR-101, adhesive and firmly pressed to the walls.
- G. After the Installation:
 - 1. Remove all excess adhesive before it dries. Use cloth dampened with water.
 - 2. Allow adhesive to set firm for approximately 24 hours before washing or applying any pressure.

3.3 CLEANING & PROTECTION

- A. Remove all debris resulting from installation, including removal of excess adhesive from floor and wall surfaces without incurring damage.
- B. All rubbish, wrappings, debris, trimmings, etc., to be removed from site and disposed of properly.
- C. Clean surfaces and leave areas ready for use. After each area is installed, protect from soiling and damage by other trades.

END OF SECTION

SECTION 097813 – STAINLESS STEEL WALL PANELS

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install stainless steel wall panels as indicated on the Drawings, including all joint treatment products, accessories, and trim materials required for completion of work.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 061000, Rough Carpentry
- C. Section 092900, Gypsum Board

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Volumes 1 and 2 of these Contract Documents.
- B. Product Data:
 - 1. Submit manufacturer's specifications and installation instructions for each product specified.
- C. Samples:
 - 1. Provide minimum 12" x 12" stainless steel panel of each type.

1.4 QUALITY ASSURANCE

- A. Qualifications of Installers:
 - 1. Use only installer experiences with stainless steel wall panels.

1.5 PRODUCT STORAGE AND HANDLING

A. Storage:

1. Deliver the materials to the job site in manufacturer's original packages and store them in their original containers with all labels intact and legible at time of use.
2. Store materials inside and protected from damage by the elements, and ensure materials will be kept dry before, during, and after installation.

B. Protection:

1. Use all means necessary to protect stainless steel materials before installation, during, and until substantial completion.
2. Ensure the protection of the installed work and materials of all other trades.
3. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the County.

1.6 PROJECT CONDITIONS

- A. Environmental Requirements: Products must be installed in an interior climate controlled environment.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. IPC Door and Wall protection systems, InPro Corporation, PO Box 406 Muskego, WI 53150, 1-800-222-5556, www.inprocorp.com
- B. Provide all stainless steel wall panels from a single source.

2.2 MATERIALS – GENERAL

A. Wall Panels: Stainless Steel Wall Panels

1. Provide stainless steel wall panel systems that include panels, outside corners and inside corners. Panel system shall include stainless steel panels that have recessed overlap joints that maintain panel flatness and minimizes panel protrusion.
2. Panel Size – Custom, see Drawings
3. Panel Thickness – 18 gauge
4. Stainless Steel - Type 304 (type 304 conforms to NSF Standard 51)

B. Stainless Steel Outside Corners

1. 2" (50.8mm) x 2" (50.8mm), 16 gauge.
2. Maximum Height 96", edges shall have an 11° taper
 - a. Stainless Steel - Type 304 (type 304 conforms to NSF Standard 51)
 - b. Attachment: Adhesive mount or screw mount

C. Stainless Steel Inside Corners

1. 2" (50.8mm) x 2" (50.8mm) 16 gauge. Maximum Height 96", edges shall have an 11° taper
 - a. Stainless Steel - Type 304 (type 304 conforms to NSF Standard 51)
 - b. Attachment: Adhesive mount or screw mount

2.3 MATERIALS

A. WC-1 Stainless Steel Wall Panels:

1. Wall panels shall be manufactured from Type 304, 18 gauge stainless steel
2. Outside and Inside Corners shall be manufactured from Type 304, 16 gauge stainless steel

2.4 COMPONENTS

A. Attachment:

1. Panels shall be adhered with field applied heavy duty adhesive
2. Corner Guards shall be attached with stainless steel Phillips head screws into counter sunk beveled mounting holes.
3. Edges shall be finished with color-match caulk.

B. Finish:

1. Stainless Steel panels and corner guards shall have a brushed finish.

3.0 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to all work of this Section, carefully inspect the installed work of other trades and verify that all such work is complete to the point where installation may properly commence.
2. Complete all finishing operations, including painting, before beginning installation of wall panel system materials.
3. Walls shall be dry and free from dirt, grease and loose paint.

B. Corrections:

1. In the event of discrepancy, immediately notify the Architect.
2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been resolved.

3.2 INSTALLING WALL PANELS

A. General:

1. Locate the wall panels as indicated on the approved detail drawing for the appropriate substrate and in compliance with the IPC installation instructions. Install wall panels level and plumb at the height indicated on the drawings. Complete installation with inside and outside corners.

3.3 CLEAN UP

A. General:

1. Do not allow the accumulation of scraps and debris arising from the work of this Section but maintain the areas in a neat and safe condition at all times.
2. At completion of the installation, clean surface in accordance with the IPC clean up and maintenance instructions.

3.4 WARRANTY

- A. The product delivered shall be free of defects.
- B. Manufacturer's standard performance warranty, as available for specified installation and environmental conditions.

END OF SECTION

SECTION 099100 - PAINTING

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide surface preparation and painting for all unfinished interior and exterior surfaces as indicated on project Drawings.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Division 5 -See structural Drawings
- E. Section 081100 - Metal Door, Windows and Frames
- C. Section 092900, Gypsum Board

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM D16 – Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related products.
 - 2. ASTM D2016 – Test Method for Moisture Content of Wood.
 - 3. ASTM D2369 – Standard Test Method for Volatile Content of Coatings
 - 4. ASTM D2697 – Standard Test method for Volume Nonvolatile Matter in Clear or Pigmented Coatings.
 - 5. ASTM D3960 – Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
- B. Master Painters Institute (MPI):
 - 1. Approved Products List, current edition.

2. Gloss and Sheen Levels
 3. "E" Range (environmental range of VOC levels)
- C. National paint and coatings Association (NPCA):
1. Guide to U.S. Government Paint Specifications
 2. Glossary of Terms: for terms not defined in the NPCA Glossary: ASTM D16 – Terminology Relating to Paint, Varnish, Lacquer and Related Products. For duplicate terms, the NPCA Glossary takes precedence.

1.4 SUBMITTALS

- A. Comply with provisions of Section 013300, Submittal Procedures.
- B. Submit 3 brushouts of each color including the specific paint sheen specified. Submit on tempered hardboard 8 x 10 inch in size. Identify each sample as to finish, color, name, number and sheen or gloss name.
- C. Submit MSDS to verify that each paint and coating used complies with the current VOC and chemical component limits of Green Seal's Standard GS-11 requirements.
- D. Certification: Submit certification according to SSPC-QP 1 for applicator of coatings on exposed structural steel (ESS).
- E. Operation and maintenance data: Submit data on types of paint, finish, color, name, number and sheen or gloss name, cleaning, touch-up and repair of painted and coated surfaces.

1.5 QUALITY ASSURANCE

- A. Comply with governing codes and regulations.
- B. Qualifications:
 1. Manufacturer: Company specializing in manufacturing products specified in this section.
 2. Applicator: Company specializing in performing work of this section with a minimum of five years experience in projects of similar scope and complexity.
 - a. Application of high performance coatings on exposed structural steel (ESS) shall be by a company certified according to SSPC-QP 1.

1.6 MOCK UP / FIELD SAMPLES

- A. For all surfaces except exposed structural steel: Before proceeding with paint application, finish with specified number of coats, 16 square feet minimum of each wall and ceiling color scheme required, clearly indicating selected colors, finish texture, materials and workmanship. Sample areas shall be located to receive daylight and/or temporary artificial light similar to that which will occur at paint color.

- 1. Locate where directed by Architect.
- 2. If approved, sample areas will serve as a minimum standard for work throughout the building.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container labels shall include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, clean up requirements, color designation, and instructions for mixing and reducing.
- C. Store paint materials at minimum ambient temperature of 45°F and a maximum of 90°F, in a ventilated area, and as required by manufacturer's instructions.

1.8 WARRANTY

- A. Colors of all surfaces finished under this section shall, at the end of one year, have remained free from serious fading, and variations, if any, shall be uniform. All materials shall have their original adherence at the end of one year, and there shall be no evidence of blisters, running, peeling, scaling, chalking, streaks or stains at the end of this period. Washing with alkali-free soap and water shall remove surface dirt without producing any deteriorating effects.

1.9 EXTRA MATERIALS

- A. Supply 1 gallon of each color; store where directed.
- B. Label each container with color, in addition to manufacturer's label.

2.0 PRODUCTS

2.1 MANUFACTURER

- A. Kelly-Moore Paints, www.kellymoore.com, or approved equal.

2.2 MATERIALS – GENERAL

- A. Use best quality grade for all systems.
- B. Catalog names and numbers refer to products as manufactured by Kelly-Moore Paints

2.3 INTERIOR PAINT SYSTEMS:

A. Interior Gypsum Board Walls and Soffits – Eggshell:

1. Prep: Sand
2. One Coat (Primer): 971 Acry-Plex
3. Two Coats: 1005 Premium Professional Low VOC Interior Latex Wall Paint Eggshell

WP-1 KMW49 Great White

WP-2 KM5147 Calamansi Green

WP-3 KM5028 Blue Martini

WP-4 KM5344 Tulips

WP-5 KM5189 Summer Lily

B. Ceilings – Eggshell :

1. Prep: Sand
2. One Coat (Primer): 971 Acry-Plex
3. Two Coats: 1050 Premium Professional Low VOC Interior Latex Wall Paint Eggshell

CP-1 KMW49 Great White

C. Interior Gypsum Board Walls & Ceilings – Restrooms and Kitchen – Semi-Gloss:

1. Prep: Sand
2. One Coat (Primer): 971 Acry-Plex
3. Two Coats: 1050 Premium Professional Low VOC Interior Latex Wall Paint Semi-Gloss

WP-1 KMW49 Great White

D. Interior Metal Door and Window Frames – Semi-Gloss:

1. Prep: Sand

2. One Coat (Primer): 287 Kel-Bond Adhesion Plus Interior/Exterior
3. Two Coats: 1250 AcryShield Premium Professional Low VOC Interior Latex Trim Paint Semi-Gloss

WP- Architect to select from manufacturer's full range.

2.4 EXTERIOR PAINT SYSTEMS:

A. See Division 13 for pre-fabricated metal building specifications.

B. Exterior Metal Door and Window Frames – Semi-Gloss:

1. Prep: Sand
2. One Coat (Primer): 287 Kel-Bond Adhesion Plus Interior/Exterior
3. Two Coats: 1250 AcryShield Premium Professional Low VOC Interior Latex Trim Paint Semi-Gloss

WP- Architect to select from manufacturer's full range.

C. Exterior Canopy – Semi-Gloss:

1. Prep: Sand
2. One Coat (Primer): 287 Kel-Bond Adhesion Plus Interior/Exterior
3. Two Coats: 1250 AcryShield Premium Professional Low VOC Exterior Latex Trim Paint Semi-Gloss

WP- Architect to select from manufacturer's full range.

3.0 EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection- Number of Coats

1. Do not apply additional coats until completed coat has been inspected and approved by the Architect.
2. Prior to all work of this Section, carefully inspect the installed work of other trades and verify that all such work is complete to the point where this installation may properly commence.
3. Verify that paint finishes may be applied in strict accordance with all pertinent regulations and the requirements of these Specifications.

4. Only inspected and approved coats of paint will be considered in determining the number of coats applied.

B. Correction

1. Do not proceed with work in areas of discrepancy until any discrepancies have been resolved.

3.2 INSTALLATION - GENERAL METHODS: INTERIOR AND EXTERIOR

- A. Inspect surfaces and correct unsatisfactory conditions. Beginning work means acceptance of substrates.

- B. Comply with paint manufacturer's printed instructions and recommendations for preparation, priming and coating work. Coordinate with work of other Sections.

- C. Remove hardware, accessories and items in place and not to be painted; provide protection prior to surface preparation and painting, reinstall removed items.

- D. Use a slightly different shade for each coat of paint so that it may be readily identified.

- E. Primer and intermediate coats shall be unscarred and completely integral when succeeding coats are applied. Sand and dust between each coat to remove defects visible from a distance of 5 feet.

- F. Completely cover surfaces to be painted to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Painted surfaces with cloudiness, spotting, laps, brush marks, runs, sags, ropiness or other imperfections will not be acceptable.

G. Drying:

1. Allow sufficient drying time between coats.
2. Modify the period as recommended by the material manufacturer to suit adverse weather conditions.

H. Moisture Content

1. Use a moisture-meter approved by the Project Inspector to test surfaces.
2. Do not apply the initial coating until moisture meter reading is within limits recommended by the paint materials manufacturer.

I. Defects

1. Sand and dust between coats to remove all defects visible to the unaided eye from a distance of 5 feet.

3.3 REINSTALLATION OF REMOVED ITEMS

- A. Following completion of painting in each space, reinstall all items removed for painting, using only workmen skilled in the particular trade.

3.4 CLEAN UP

- A. General
 - 1. During progress of the Work, do not allow the accumulation of empty containers or other excess items in areas specifically set aside for that purpose.
 - 2. Prevent accidental spilling of paint materials and, in the event of such spill, immediately remove all spilled material and the waste or other equipment used to clean up the spill, and wash the surfaces to their original undamaged conditions, all at no additional cost to the City.

3.5 WARRANTY

- A. The product delivered shall be free from defects.
- B. Manufacturer's standard performance warranty, as available for specified installation and environmental conditions.

END OF SECTION

099656 - EPOXY COATINGS

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install epoxy coating throughout kitchen are and prep are as specified herein.

1.2 RELATED SECTIONS

- A. Division 3, Concrete
- B. Section 072600, Surface Applied Vapor Retarder

1.3 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Shop Drawings: Submit color charts for color selection and provide actual samples of the required color and texture on 2" x 4" hardboard
- D. Manufacturer's written instruction for recommended maintenance practices.

1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Installer Qualifications: Authorized representative of the manufacturer with minimum five years documented experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened labeled packaging until ready for installation.
- B. Protect materials from exposure to moisture until ready for installation.
- C. Store materials in a dry, ventilated weathertight location.

1.6 PROJECT CONDITIONS

- A. Pre-Installation Conference: Convene a pre-installation conference just prior to commencement of field operations, to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

2.0 GENERAL

2.1 MANUFACTURERS

- A. Revolan Systems, DBA Tera-Lite Inc., 1631 South 10th Street, San Jose, CA 95112, 408-288-8655, teralite@ix.netcom.com, www.tera-lite.com
- B. Substitutions: Not permitted.

2.2 MATERIALS

- A. Interior Epoxy Coating: Tera-Gem III DQ 1/4" by Tera-Lite Inc.
 - 1. Color and Finish: See Schedule
 - 2. Provide Integral coved base

2.3 SCHEDULE

Reference #	Series	Color	Finish Texture
EPX-1	Tera-Gem III DQ 1/4"	Light Grey	#70 Mesh
EB-1	Tera-Gem III DQ 1/4" Integral coved base	Light Grey	#70 Mesh
Note: Verify location, type and size with drawings			

3.0 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until surfaces have been properly prepared.
- B. Calcium Chloride Testing: Prior to the start of any work on the concrete, perform a calcium chloride test at the rate of 1 per 1,000 sq ft. For direct application of the epoxy floor system to concrete, readings must be less than 10 lbs per 24 hours per 1,000 sq ft. Readings of more than 10 lbs will be noted and those areas must be

treated with a vapor barrier as recommended by the supplier of the epoxy system, AquaFin Vaportight Coat SG3.

- C. If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Concrete surfaces must be free from surface contaminants, laitance, curing compounds, oils, greases, dirt, chemical contaminants, unbounded coatings, etc. The surface must be sound, without delaminations. User must notify manufacturer for different conditions. To properly clean concrete surfaces, the concrete may be ground, sandblasted, steel shot-blasted, scarified, water blasted, or other approved technique.

3.3 INSTALLATION

- A. Primer: Use Tera-Gem III DQ liquid components as primer. Use a clean bucket and mix 2 parts of A to 1 part of B by volume. Stir with a mechanical agitator for 1-2 minutes. Distribute mixed material evenly over the floor surface using rollers, squeegees or spray. Spread rate will vary from 70 to 150 sq ft per gallon. Do not apply over standing water or let primer set before applying next coat.
- B. Cove Base Application: Use a clean container and mix Tera-Gem III DQ liquid components at a ration to 2 parts A to 1 part B by volume. To one weight equivalents of mixed liquid components add approximately 7-weight equivalent of aggregate. Mix all components using an electrical drill motor agitator or a plaster mixer. Mix all components for 2-3 minutes or until uniformly wetted. Transfer to installation area and trowel to a thickness of 1/8" and a minimum of 6" high.
- C. Basecoat Application: Use a clean container and mix Tera-Gem III DQ liquid components at a ration to 2 parts A to 1 part B by volume. To one weight equivalents of mixed liquid components add approximately 7-weight equivalent of aggregate. Mix all components using an electrical drill motor agitator or a plaster mixer. Mix all components for 2-3 minutes or until uniformly wetted. Transfer to installation area and trowel to a thickness of 1/4".
- D. Sealer/Anti-Skid: To seal the epoxy/aggregate composite for easier cleaning and to assure non-skid property, apply two seal coats using Tera-Gem III Pigmented Sealer. Sand between coats. Apply the first seal coat. Let the surface set. Mix and place the second seal coat similarly to the first coat, application rate is approx 125 sq ft per gallon. During the second seal coat process broadcast a graded silica aggregate for anti-skid and backroll. A "Roll-Seed-Roll" texture can be achieved by heavily broadcasting silica between the first and second seal coats.

3.5 CLEANING

- A. Clean floor and surrounding surfaces
- B. Remove temporary labels and visible markings.

3.6 PROTECTION

- A. Do not permit construction traffic on coated surface for a minimum of 48 hours after final application.
- B. Protect installed products until completion of project.
- C. Touch-up, damaged coatings and finishes and repair minor damage before Substantial Completion.

END OF SECTION

Division 10: Specialties

SECTION 101010 – KITCHEN EQUIPMENT

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Furnish all material and labor required to completely provide, deliver and install all Kitchen Equipment as specified herein and as shown on the drawings. This work shall be in strict accordance with the plans and specifications with all dimensions verified in the field prior to any fabrication.
 - 1. Coordinate the Kitchen Equipment with the respective trades performing preparatory work for the installation of the Kitchen Equipment.
 - 2. Comply with all Federal, State and Municipal regulations which bear on the execution of this project. Food service aisles shall be a minimum of 36 inch wide and tray slides shall be mounted at 34 inches maximum above the finished floor. Kitchen equipment required to be accessible shall conform to all reach requirements in CDC 1104B-5, 1104B-6 and figures 11B-16 and 11B-17.
- D. Work Includes:
 - 1. Materials shown on the Kitchen Equipment Schedule.
 - 2. Piping, valves, and plumbing accessories that is integral within the equipment.
 - 3. Furnishing control devices such as solenoid valves that are not integral with the equipment, for installation by Plumbing Division 22, Mechanical Division 23, and/or Electrical Division 26.
 - 4. Wiring, wiring devices, controls and mechanical accessories that are integral in the equipment.
 - 5. Ventilating ducts, flues, controls and mechanical accessories that are integral in the equipment.
 - 6. Anchors, fasteners, fillers and sealants for mounting equipment securely in place.

7. Cooperation with all other contractors on the job including the furnishing of information in the form of drawings, wiring diagrams and other data.
8. Touch-up painting after the installation of the Kitchen equipment.

E. Related Sections:

1. Section 1028113 - Toilet Accessories
2. Division 22 Plumbing.
2. Division 23 Mechanical.
3. Division 26 Electrical.

1.2 QUALITY ASSURANCE

A. Qualifications:

1. Installer: Regularly engaged in providing Kitchen equipment from manufacturers of this type of equipment a minimum of 5 years with at least 5 installations of this size and type that are at least each 3 years old.

B. Standard of Manufacture

1. Kitchen equipment that is specified as “custom” having no manufacture name or model number shall be manufactured by the Kitchen equipment fabricator with at least five (5) years of experience with engineering, design and fabrication of food service equipment. The manufacture shall be subject to the review of the Architect and/or County and shall be approved by the National Sanitation Foundation (NSF). All fabricated equipment shall be constructed in strict compliance with the latest standards of the NSF and shall bear the mark of the NSF in full compliance with all applicable codes and ordinances.
2. All electrically heated or operated equipment shall bear the seal of approval of the Underwriters Laboratories, and shall comply with the National Electrical Code and all local Codes and Ordinances.
3. All food service equipment that is specified as “buy-out” having a specific manufacture name and model number shall comply with the latest editions of the NSF.
4. All Gas heated or operated equipment shall bear the seal of approval of the American Gas Association (AGA).

5. All Steam heated or operated equipment shall bear the seal of approval of the American Society of Mechanical Engineers (ASME) and shall be ASME approved.
6. Food shields and “Sneeze” guards shall meet all the requirements of NSF Standard 2.

1.3 SUBMITTALS

A. Shop Drawings / Equipment Brochures:

1. No ordering or fabrication of equipment shall take place until such time as the equipment brochures and shop drawings have been reviewed by the Architect and/or County. Receipt of this review shall not relieve the Contractor from the responsibility of verifying all quantities and related dimensions, maintaining the specified quality of equipment and verifying conditions at the job site.
2. Equipment Brochures: within twenty (20) calendar days after award of the contract, six (6) brochures containing manufacturer’s specification sheets, dimensioned drawings and/or other pertinent data describing all items of standard manufacture shall be submitted for review by the Architect and County. Sheets with the notation “Fabricated Item” and name of the fabricated item, as well as any required mechanical, plumbing or electrical requirements shall be inserted between the manufacturer’s specification sheets describing the “buy-out” equipment; thus giving a complete brochure with all things accounted for. These brochures shall have hard white covers with clear transparent overlays and locking rings. The name of the contractor, Architect, and County and project clearly identified in large readable type. Failure to provide brochures in the manner as described above will be cause for rejection of said brochures.
3. Rough-in and Equipment Location Drawings: within thirty (30) calendar days after award of the contract, six (6) sets of bond prints of complete rough-in and details for electrical and plumbing services with both vertical and horizontal dimensions, from column center-lines or exterior walls for location of said connection points and rough-in locations shall be submitted for review by the Architect and/or County. Equipment location plans shall be drawn to scale of not less than 1/4” = 1’-0” and include a schedule of equipment clearly identifying all items. Minimum drawing size shall be 24” x 36”.
4. Shop Drawings: within thirty (30) calendar days after award of the contract, six (6) sets of bond prints of shop fabrication drawings shall be submitted for review by the Architect and/or County. Plans shall be drawn to scale of not less than 1/2” = 1’-0”. Additional plan views, elevations and sections at 3/4” = 1’-0” shall be supplied of all counters and tables with complete dimensions. All shop practices regarding joints, gussets, bracing, tie-downs, supports, etc. shall be clearly defined as well as gauges and quality of metals and brads and

model numbers of all miscellaneous fittings, plumbing and electrical trim. The drawings shall also show locations of blocking (supplied under other sections) for all wall and/or ceiling mounted Kitchen Equipment. Minimum drawings size shall be 24" x 36".

B. Substitutions:

1. Manufacturer's listed in this section are used as standards for quality. All substitutions shall be approved by the Architect and/or County prior to fabrication and installation.
2. Installation of any qualified substituted equipment shall be the Kitchen Equipment Contractor's responsibility, including any mechanical, electrical, structural changes required for the installation. Any qualified substitution shall be without additional cost to the County.

1.4 DISCREPANCIES

- A. In the event of discrepancies within the Contract Documents, the Architect and/or County shall be so notified in sufficient time prior to bid opening, ten (10) days to allow issuance of an addendum.
- B. In the event that time does not permit notification or clarification of discrepancies prior to the bid opening, the following shall apply: The drawings and drawing schedules shall govern in matters of quantity; the specifications in matter of quality. In the event of conflict with drawings involving quantities, or with the specifications involving quality, the greater quantity and high quality shall apply. Such discrepancies shall be noted and clarified in the contractor's bid. No additional allowances will be made because of errors, ambiguities or omissions which reasonably should have been discovered during the preparation of the bid.

1.5 RESPONSIBILITY

- A. The work as specified in this sections shall include assuring that all required submittals conform to the intent and meaning of the documents, conditions at the job site, and all local codes and ordinances.
- B. Visit the job site to field check actual wall dimensions and utility rough-ins. Be responsible for furnishing, fabricating, and installing the equipment in accordance with the available space and utility services as they exist on the job site.
- C. Check all door openings, passageways, elevators, etc., to verify that the equipment can be transported to its proper location within the building. If necessary, check the possibility with the General Contractor of holding wall erection, placement of door jambs, windows, etc., for the purpose of moving equipment to its proper location.
- D. Notify the Architect and/or County of any discrepancies between the plans and specifications, prior to fabrication of any equipment, to actual condition on the job.

- E. If any special hoisting equipment and operators are required, include cost as part of this work.

1.6 DELIVERY AND STORAGE

- A. All equipment specified herein shall be delivered to the job site; received and handled by the Contractor or his authorized agent. The County shall in no way be expected to store or handle any such equipment.
- B. All equipment shall be delivered in such a manner as to protect it against dirt, water, chemical or mechanical injury.
- C. Throughout the progress of the work, the Kitchen Equipment Contractor shall keep the work area free of debris of all types resulting from his work.
- D. All packing material shall be removed from the project location by the General Contractor.

1.7 COORDINATION

- A. Coordinate work with mechanical, electrical, plumbing interiors and other trades whose work is in conjunction with equipment specified herein.

1.8 MEASUREMENTS

- A. Verify all dimensions shown on the drawings by taking field measurements at the job site prior to fabrication of equipment or ordering equipment. Proper fit and attachment of all parts is required and is the sole responsibility of the Kitchen Equipment Contractor. If necessary, all equipment shall be fabricated so that it may be handled through finished door openings.

1.9 GUARANTEE / WARRANTY

- A. All work shall be guaranteed by Kitchen Equipment Contractor against all defects for term of one (1) year from the date of substantial completion. This guarantee shall cover replacement of defective material at the Kitchen Equipment Contractor's expense, including transportation and labor. This guarantee will not cover any cost for replacement of parts or work made necessary by carelessness or misuse of the equipment by others.
- B. Kitchen Equipment Contractor shall provide at his own expense the installation, start-up and service for one (1) year from date of substantial completion of the project; the replacement of all condensing units and other refrigeration devices supplied under this contract. In addition to this one (1) year free service, the condensing units shall have a five (5) year compressor warranty; said warranty commencing at the date of project completion.

2.0 PRODUCTS

2.1 MATERIALS

- A. Metal for construction purposes, where entirely concealed, shall be steel of wrought iron sections galvanized by the hot-dip process after fabrication. Bolts, screws, rivets and similar attachments to this galvanized work shall be galvanized or brass. Exposed screw and rivet work shall be finished to match adjacent surfaces, flush and buffed smooth. Finished work shall be free of tool or construction marks, dents, or other imperfections; and at the completion of the work, all metal shall be gone over with a portable machine and buffed and dressed to perfect surfaces.
- B. All materials shall be new and of first grade.
- C. Furnish a certified copy of the mill analysis of materials to the Architect and/or County.
- D. Stainless steel sheets shall conform to ASTM A240, Type 304 Condition A, 18-8 having a No.4 finish. No.2 finish shall be acceptable on surfaces of equipment not exposed to view. All shall be uniform throughout in color, finish and appearance.
- E. Stainless steel tubing and pipe shall be Type 304, 18-8, having a No.4 finish, and shall conform to either ASTM A213 if seamless or ASTM A249 if welded.
- F. Plate glass shall be 1/2" thick safety glass with polished edges.

3.0 EXECUTION

3.1 POSITIONING OF EQUIPMENT

- A. Installation procedure, details and scheduling shall be so arranged that the work of other trades may progress without unnecessary delay, interference or damage.
- B. Kitchen Equipment Contractor shall do all fitting, joining, scribing, caulking and adjusting necessary to install any fixed item of equipment in its designated location; and shall locate and/or store portable, non-fixed items as directed by the Architect and/or County with due regard for the security and protection from damage of the items involved.

3.2 INSTALLATION

- A. Install all equipment per manufacturer's recommended method and requirements.
- B. Install all equipment per "Guidelines for Seismic Restraints of Kitchen Equipment" by the Sheet Metal and Air Conditioning Contractors National Association (SMACNA).

3.3 POST INSTALLATION PROCEDURES

- A. Thoroughly clean all equipment prior to being offered for final acceptance. This shall include removal of all stains, paint spots, protective wrapping and coatings, tapes, grease, oil, plaster, dust, polishing compounds, etc. and cleaning of floors in food service areas.
- B. All equipment shall undergo “Start-Up” procedure by a Factory Authorized service dealer at least ten (10) days prior to being offered for final acceptance. Correct any inspected defects, and repeat inspection to insure proper operation of all equipment prior to final acceptance and for a period ninety days after final acceptance.
- C. Furnish to the County, two (2) sets of dimensional print copies of data sheets, spare parts lists and operating manuals for each piece of equipment, bound in a loose leaf binder and one (1) electronic set of same. Binder shall be complete with index of equipment and list of service contracts and said agencies to perform these services. Furnish all warranty forms as required.
- D. Contractor in coordination with the Kitchen Equipment Contractor to arrange demonstrations of the operation and maintenance of all equipment by competent instructors. Demonstrations shall take place within ten (10) days prior to the acceptance of the kitchen. All instruction periods shall be scheduled with the Architect and/or County fourteen (14) days prior to commencement of same at times convenient to the County and Kitchen personnel.

4.0 EQUIPMENT SCHEDULE



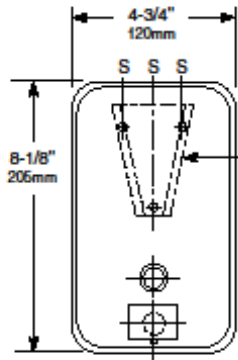
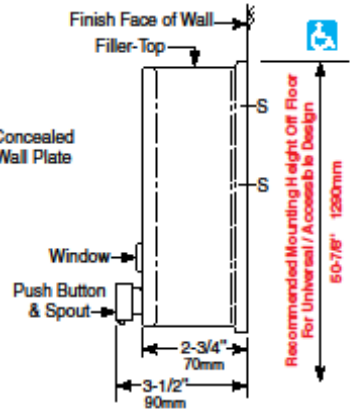
4.1 Food Service Equipment List and Schedule

- A. Comply with standards of The California Administration Code, Title 24, Part No. 2.
- B. Comply with current California Energy Commission Appliance Efficiency Regulations.
- C. Equipment in the following schedule is listed by Item Numbers shown on Drawings.

ITEM NO	DESCRIPTION	MANUF. / MANUF. NO.	PAGE #
1	SOAP DISPENSER	B-2111	9
2	PAPER TOWEL DISPENSER	B-4262	10
3	HAND SINK	7-PS-75 & K-132	11-12
4	PREP SINK	600S11818218	13-14
5	3 COMP SINK	600S31824224	15

6	FLOOR SINK	Z1910	16
7	PREP SINK TABLE	600ST3048RT	17-18
8	PREP TABLES	600T2496G	19-22
9	WORK TABLES	600TSB3060S & 600TSB3072S	23-26
10	DEMO TABLE W/ MIRROR	DT3672SE	27-28
11	TRASH CAN W/ DOLLY	475TC32BRKIT	29-30
12	HEATING CABINET	HPI1836	31-32
13	HOT/COLD DROP INS	HCWI-6DA	33-34
14	SHELVING	SUPER ERECTA	35-38
15	MIXER	HL600	39-42
16	PAN RACKS	252-DR-36	43-44
17	POT RACK SHELF	600PS1572	445
18	GRIDDLE AND STAND	GTGG48-GT48M	46-47
19	FRYER	GF40	48-49
20	RANGE	G48-8RS & G48-8LL	45-51
21	DISHWASHER	HT-180	52-53
22	CLEAN DISHTABLE	CDT84	54-56
23	REACH IN FRIDGE	2RS	57-58
24	TRAY SHELVES	TTR-2 & TTR-6	59
25	SNEEZEGUARD	EP21	60-61
26	WALK IN FREEZER/FRIDGE		62
27	AIR CURTAIN	LPV242-1U	63-64


1	SOAP DISPENSER	WALL MOUNTED	BOBRICK	B-2111
---	----------------	--------------	---------	--------

 Technical Data	ClassicSeries® SURFACE-MOUNTED SOAP DISPENSER	B-2111
		
<p>MATERIALS:</p> <p>Container — 18-8, Type-304, 22-gauge (0.8mm) stainless steel with satin-finish. Body is drawn, one-piece, seamless construction. Back plate has mounting bracket attached. Furnished with concealed acrylic refill-indicator window and a locked, hinged stainless steel lid for top filling. Capacity: 40-fl oz (1.2-L).</p> <p>Valve — Black molded plastic push button and spout. Soap head-holding mushroom valve. Stainless steel spring. U-packing seal and duckbill. Antibacterial-soap-resistant plastic cylinder.</p> <p>OPERATION:</p> <p>Corrosion-resistant valve dispenses commercially marketed all-purpose hand soaps. To prevent corrosion of the tank, use only chloride-free pH-neutral liquid soaps. Valve is operable with one hand, without tight grasping, pinching, or twisting of the wrist, and with less than 5 pounds of force (22.2 N) to comply with accessible design guidelines (including ADAAG in the U.S.A.). Window indicates when refill is required. The locked, hinged lid opens for top filling only with special key provided. Concealed, vandal-resistant mounting.</p> <p>INSTALLATION:</p> <p>Secure wall plate to the wall with three sheet-metal screws, furnished by manufacturer, at points indicated by an S. Slide mounting bracket of container down onto wall plate and secure unit with furnished locking-screw. For plaster or dry wall construction, provide concealed backing to comply with local building codes and secure with sheet-metal screws furnished. For other wall surfaces, provide fiber plugs or expansion shields for use with sheet-metal screws furnished, or provide 1/8" (3mm) toggle bolts or expansion bolts.</p> <p>Note: Surface-mount the dispenser plumb and true with valve 6" (150mm) to right or left of lavatory center. Provide 4" (100mm) minimum clearance from the lid to the underside of any horizontal projection. Push buttons should be located 44" (1120mm) maximum above the finish floor.</p> <p>SPECIFICATION:</p> <p>Surface-mounted soap dispenser shall be Type-304 stainless steel with satin-finish. Corrosion-resistant valve shall dispense commercially marketed all-purpose hand soaps, non-iodine based soaps and do not use alcohol based sanitisers. To prevent corrosion of the tank, use only chloride-free pH-neutral liquid soaps. Valve shall be operable with one hand and with less than 5 pounds of force (22.2 N) to comply with accessible design guidelines (including ADAAG in the U.S.A.). Container shall be equipped with a clear acrylic refill-indicator window; a locked, hinged stainless steel lid for top filling; and shall have a capacity of 40-fl oz (1.2-L). Unit shall have concealed, vandal-resistant mounting.</p> <p>Surface-Mounted Soap Dispenser shall be Model B-2111 of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.</p>		

The illustrations and descriptions herein are applicable to production as of the date of this Technical Data Sheet. The manufacturer reserves the right to, and does from time to time, make changes and improvements in designs and dimensions.

Revised 1/22/18 Printed in U.S.A.
 © 2018 by Bobrick Washroom Equipment, Inc.


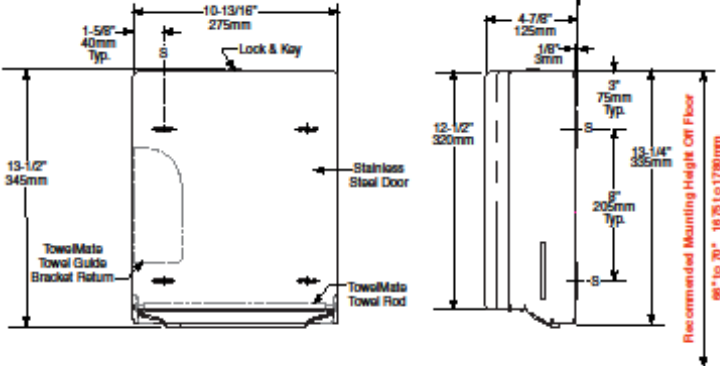
2	TOWEL DISPENSER	WALL MOUNTED	BOBRICK	B-4262
---	-----------------	--------------	---------	--------



Technical Data

ConturaSeries®
SURFACE-MOUNTED
PAPER TOWEL DISPENSER

B-4262

MATERIALS:
Cabinet — 18-8, type-304, 22-gauge (0.8mm) stainless steel. All-welded construction. Exposed surfaces have satin finish. Radius on corners of cabinet match corners and edges of door and other Bobrick ConturaSeries washroom accessories. Back has recessed mounting slots to prevent mounting screw heads from snagging towels. Rounded towel tray has hemmed opening to dispense paper towels without tearing. Cabinet inside equipped with 90° return towel guide bracket to prevent paper towels from falling forward out when door is opened for servicing. Unit equipped with TowelMate consisting of a 90° return towel guide angle inside cabinet to prevent paper towels from falling forward out when door is opened for servicing and a Nylon Rod across the center of the towel tray to dispense paper towels one at a time. Equipped with a tumbler lock keyed like other Bobrick washroom accessories. Unit shall be capable of dispensing 400 C-fold or 525 multifold paper towels 2-1/2" to 3-13/16" (64-97mm) deep.
Door — 18-8, type-304, 22-gauge (0.8mm) stainless steel with satin finish. Drawn, one-piece, seamless construction. Front of door has same degree of arc as other Bobrick ConturaSeries washroom accessories. Radius on corners and edges match corners of cabinet and other ConturaSeries accessories. Secured to cabinet with a full-length stainless steel piano-hinge.
TowelMate® Towel Rod Assembly — Consisting of a round Nylon Rod and (2) stainless steel Rod Screws for attachment, is field replaceable. Stainless steel Stop Screws (2) lock TowelMate Rod assembly in place. To retrofit TowelMate into existing installed units manufactured prior to June 2010, order TowelMate Accessory Bobrick Model No. 369-130.

OPERATION:
 Unit dispenses C-fold or multifold paper towels 2-1/2" to 3-13/16" (64-97mm) deep without adjustment or use of adapters. Load paper in towel tray, and then pull one sheet of paper towel over the TowelMate towel rod and out to conceal rod and start dispense. Slots in sides of cabinet indicate refill time. After unlocking with key provided, door swings down for loading paper towels into cabinet.

INSTALLATION:
 Mount unit on wall with four #10 x 1-1/4" sheet-metal mounting screws (not furnished) at points indicated by an S. For plaster or dry wall construction, provide concealed backing to comply with local building codes, then secure unit with sheet-metal screws. For other wall surfaces, provide fiber plugs or expansion shields for use with sheet-metal screws, or provide 1/8" (3mm) toggle bolts or expansion bolts.

SPECIFICATION:
 Surface-mounted paper towel dispenser shall be type-304 stainless steel with all-welded construction; exposed surfaces shall have satin finish. Front of paper towel dispenser door shall have same degree of arc as other Bobrick ConturaSeries accessories in the washroom. Radius on corners and edges of door and cabinet shall complement other Bobrick ConturaSeries washroom accessories. Unit equipped with TowelMate consisting of a 90° return towel guide bracket inside cabinet to prevent paper towels from falling forward out when door is opened for servicing and a Nylon Rod across the center of the towel tray to dispense paper towels one at a time. Door shall be drawn, one-piece, seamless construction; secured to cabinet with a full-length stainless steel piano-hinge; and equipped with a tumbler lock keyed like other Bobrick washroom accessories. Unit shall be capable of dispensing 400 C-fold or 525 multifold paper towels 2-1/2" to 3-13/16" (64-97mm) deep without adjustment or use of adapters.

Surface-Mounted Paper Towel Dispenser shall be Model B-4262 of Bobrick Washroom Equipment, Inc., Clifton Park, New York; Jackson, Tennessee; Los Angeles, California; Bobrick Washroom Equipment Company, Scarborough, Ontario; Bobrick Washroom Equipment Pty. Ltd., Australia; and Bobrick Washroom Equipment Limited, United Kingdom.

The illustrations and descriptions herein are applicable to production as of the date of this Technical Data Sheet. The manufacturer reserves the right to, and does from time to time, make changes and improvements in designs and dimensions. B-4262 r80111 Printed in U.S.A. © 2011 by Bobrick Washroom Equipment, Inc.

3	HAND SINK	WALL MOUNTED	ADVANCE TABCO	7-PS-75 & K-132
---	-----------	--------------	---------------	-----------------



STAINLESS STEEL
HAND SINKS
A.D.A COMPLIANT LAVATORIES
 Conforms To NSF 61/9 Lead Free Requirements



7-PS-25



7-PS-75



7-PS-26



Optional A.D.A. Compliant Bubbler can be added to the 7-PS-25, 7-PS-26 & 7-PS-75 Only
 Use Model # K-47

Item #:	Qty #:
Model #:	
Project #:	

FEATURES:

One piece **Deep Drawn** sink bowl design.
 Sink bowl is 16" x 14" x 5".
 All sink bowls have a large liberal radii with a minimum dimension of 2" and are rectangular in design for increased capacity.
 Keyhole wall mount bracket.
 1 1/2" stainless steel drain with strainer plate.

Additional Specific Features:

- 7-PS-25** 6" Extended deck mounted gooseneck faucet with wrist handles & deck mounted liquid soap dispenser.
- 7-PS-26** includes a "Hands Free" AC/DC operated gooseneck faucet & deck mounted, liquid soap dispenser.
- 7-PS-75** Sink Only. Faucet not included. Three 1-3/8" dia. Holes Punched.

CONSTRUCTION:

All TIG welded.
 Welded areas blended to match adjacent surfaces and to a satin finish.
 Die formed Countertop Edge with a 3/8" No-Drip offset.
 Bowl made from One sheet of stainless steel - No Seams.

MATERIAL:

Heavy gauge type 304 series stainless steel.
 Wall mounting bracket is Galvanized and of offset design.
 All fittings are brass / chrome plated unless otherwise indicated.

MECHANICAL:

Faucet supply is 1/2" IPS male thread hot and cold.

Optional 8" O.C. Faucets Available

	Heavy Duty 5-1/2" Gooseneck		Heavy Duty 9" Swing Spout
K-132		K-133	

WARNING:
 Equipment that includes a faucet may expose you to chemicals, including lead, that are known to the State of California to cause cancer or birth defects or other reproductive harm. For more Info., visit www.p65warnings.ca.gov.

	Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.	
	For Orders & Customer Service: Email: customer@advancetabco.com or Fax: 631-242-6900	For Smart Fabrication™ Quotes: Email: smartfab@advancetabco.com or Fax: 631-586-2933

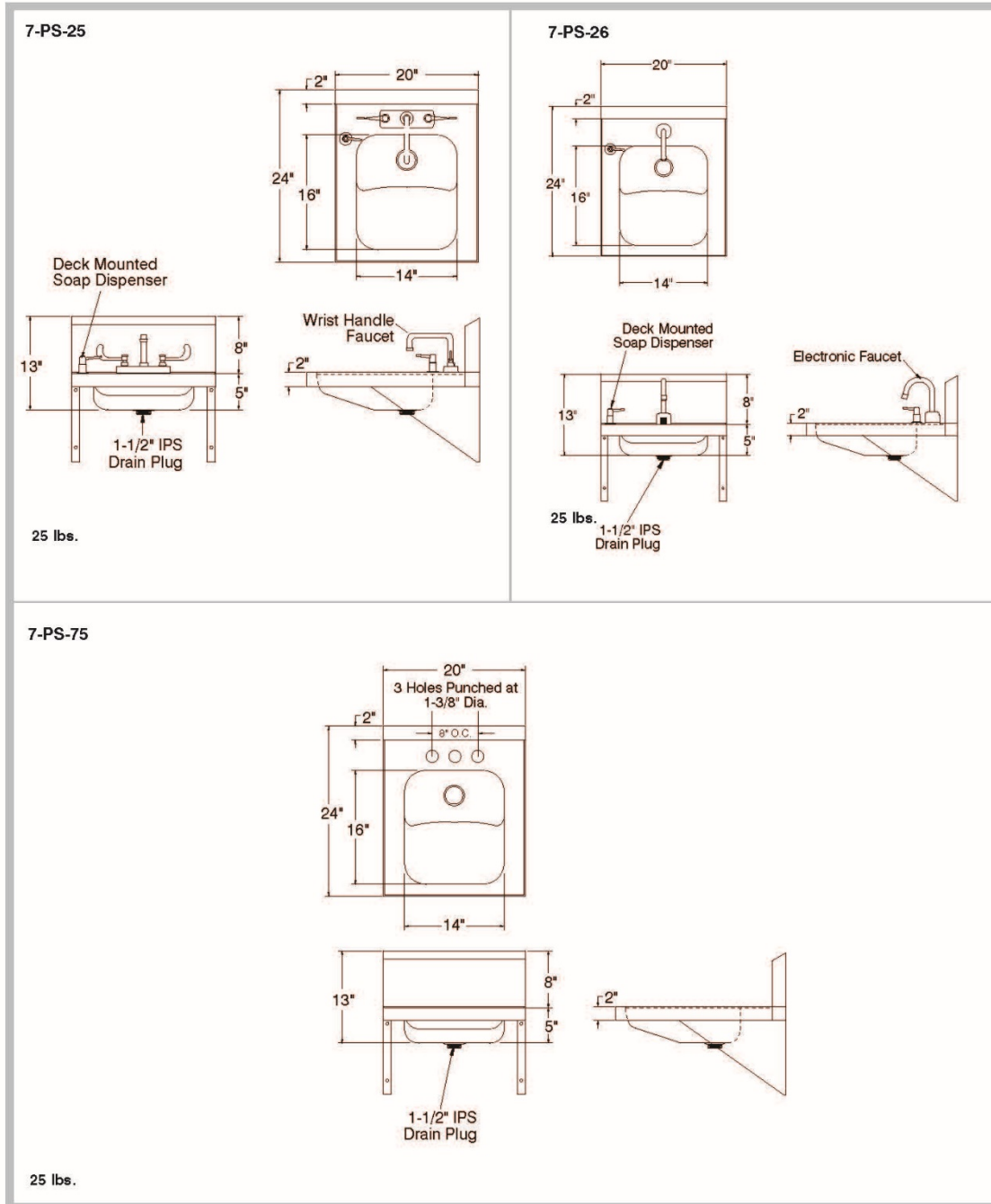
REF-B

DIMENSIONS and SPECIFICATIONS

TOL Overall: ± .500" Interior: ± .250"

FITTINGS SUPPLIED AS SHOWN

ALL DIMENSIONS ARE TYPICAL



REF-B 200 Heartland Boulevard, Edgewood, NY 11717-8380

ADVANCE TABCO is constantly engaged in a program of improving our products. Therefore, we reserve the right to change specifications without prior notice.

© ADVANCE TABCO, SEPTEMBER 2018

4	PREP SINK	6" LEGS	REGENCY	600S11818218
---	-----------	---------	---------	--------------

**16-GAUGE STAINLESS STEEL
 ONE COMPARTMENT SINK
 WITH TWO DRAINBOARDS**

ITEM #: _____ QUANTITY: ____
 PROJECT: _____
 APPROVAL: _____
 DATE: _____



FEATURES

- Made of high-quality 16-gauge, type 304 stainless steel
- Galvanized 1 5/8" steel legs with sockets
- Adjustable bullet feet for added stability
- Faucet holes pre-punched on 8" centers (faucet sold separately)
- 3 1/2" IPS drain connection
- Rolled edge contains splashes and overflow

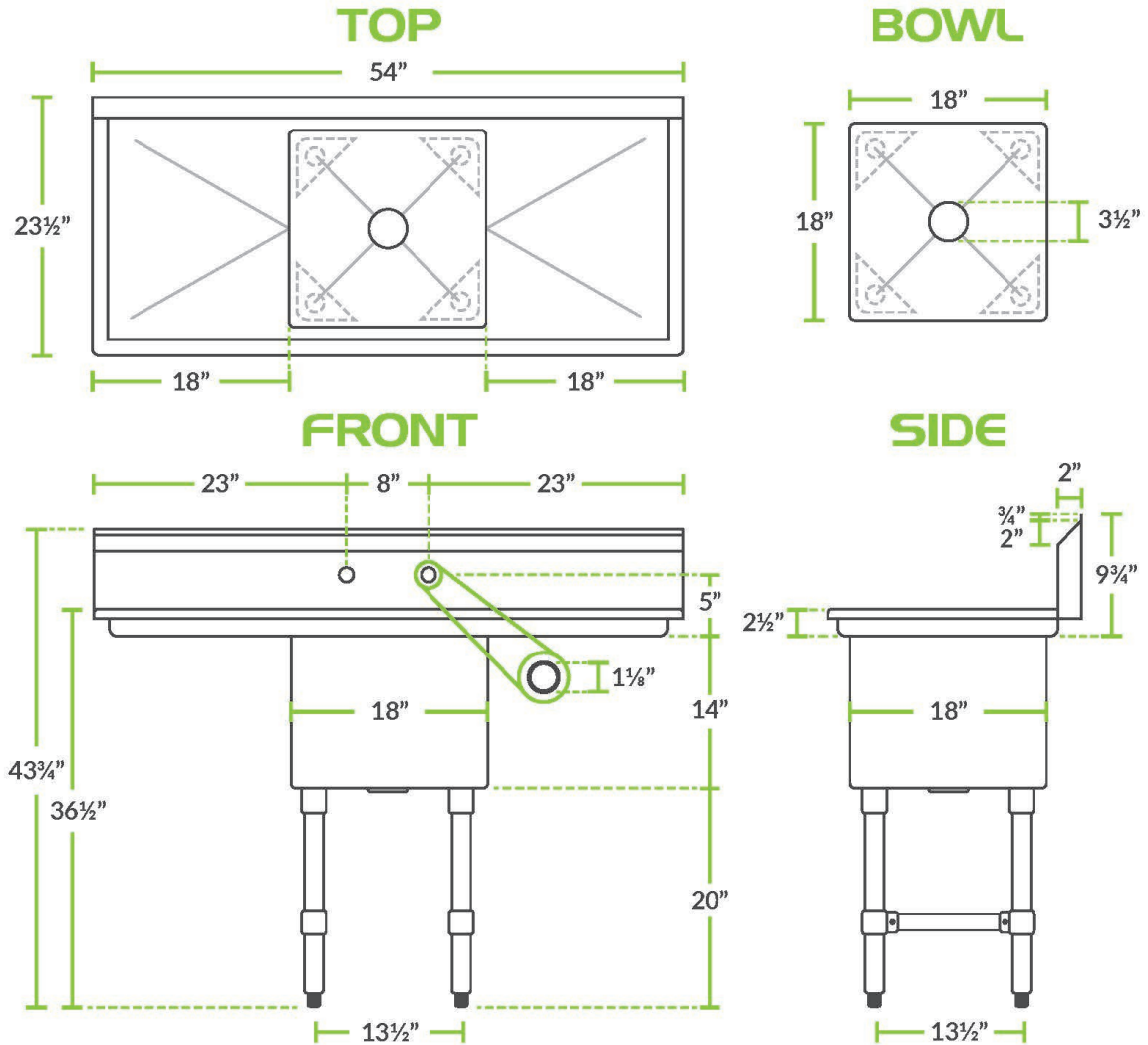
SPECIFICATIONS

ITEM	LENGTH	DEPTH	HEIGHT (Total)	HEIGHT (Work)	BOWL DEPTH	BOWL L to R	BOWL F to B	NUMBER OF DRAINBOARDS	SIDE	NET WEIGHT
600S11818218	54"	23 1/2"	43 3/4"	36 1/2"	14"	18"	18"	2	Both	57 LB.



REGENCYTABLESANDSINKS.COM

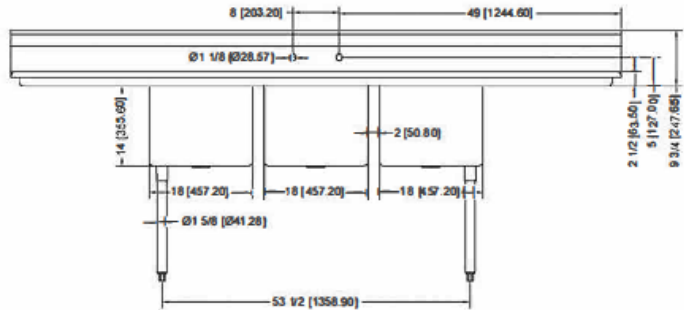
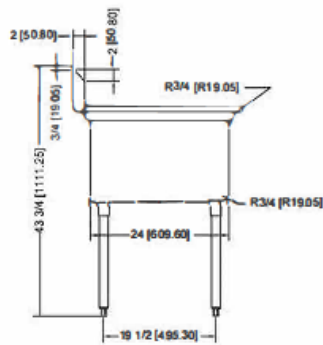
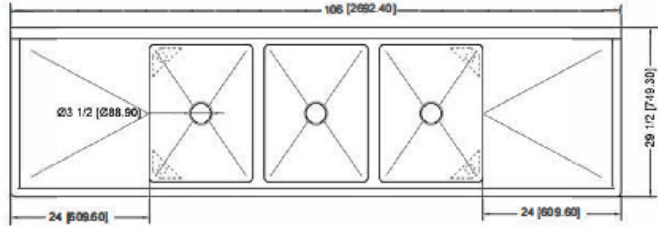
**16-GAUGE STAINLESS STEEL
ONE COMPARTMENT SINK
WITH TWO DRAINBOARDS**



REGENCYTABLESANDSINKS.COM

5	3 COMP SINK	6" LEGS	REGENCY	600S31824224
---	-------------	---------	---------	--------------

16GA.304S/S sink, 3comp:18"X24"X14"
 16-gauge type 304 stainless steel legs and feet
 24" left & 24" right drainboards
 Centered drain with 3.5" drain basket
 Wooden skid packing
 G.W.:73.00KGS



600S31824224

6	FLOOR SINK	IN GROUND	ZURN	Z1910
---	------------	-----------	------	-------



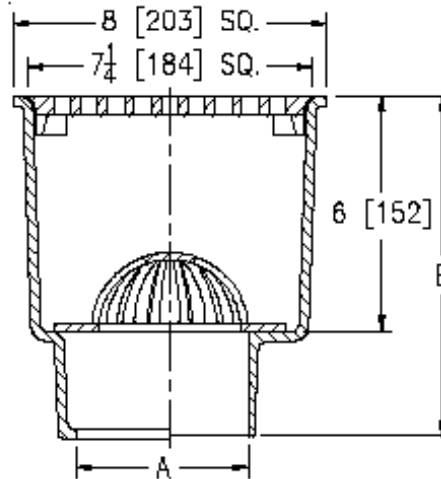
Z1910

8 X 8 [203 X 203] A.R.E. SANI-FLOR RECEPTOR
 6 [152] SUMP DEPTH

SPECIFICATION SHEET

TAG _____

Dimensional Data (Inches and [mm]) are Subject to Manufacturing Tolerances and Change Without Notice



A - Pipe Size in [mm]	Approx Wt lbs. [kg]	Grate Open Area in ² [cm ²]
2, 3, 4 [51, 76, 102]	25 [11]	19 [123]

ENGINEERING SPECIFICATION: ZURN Z1910

Sani-Flor Receptor 8" x 8" x 6" [203mm x 203mm x 152mm] deep cast iron body and square, medium-duty grate with 7/16" [11mm] slotted openings, white acid resisting porcelain enamel interior and top, complete with white ABS anti-splash interior bottom dome strainer.

OPTIONS (Check/specify appropriate options)

PIPE SIZE

- 3, 4 [76, 102]
- 2, 3, 4 [51, 76, 102]
- 2, 3, 4 [51, 76, 102]

(Specify size/type) **OUTLET**

- ___ IC Inside Caulk
- ___ NH No-Hub
- ___ NL Neo-Loc

'E' BODY HT. DIMENSION

Z	ZN
8-3/4 [222]	9-1/4 [235]
8-5/8 [219]	9-1/8 [232]
8 [203]	8-1/2 [216]

PREFIXES

- ___ Z Cast Iron Body with White A.R.E. Interior*
- ___ ZN Cast Iron Body with White A.R.E. Interior, 8-9/16 [217] Square N.B. Frame and Full Grate with 5/16 [8] Square Openings (Add 1/2 [13] to 8 [203] Dim.)

SUFFIXES

- ___ -DX Dex-O-Tex Flange (ZN Only)
- ___ -K Anchor Flange
- ___ -KC Anchor Flange with Seepage Holes and Clamp Collar
- ___ -LD Less Bottom Dome Strainer
- ___ -P 1/2 [13] Trap Primer Connection (See Z1023)
- ___ -TC Neo-Loc Test Cap Gasket (2, 3, 4 [51, 76, 102] NL Bottom Outlet Only)
- ___ -1 Less Grate
- ___ -2 1/2 Grate
- ___ -3 3/4 Grate
- ___ -4 Full Grate with Square Center Opening
- ___ -6 Grate w/ 6 [152] Dia. x 6 [152] High Funnel
- ___ -8 Grate w/ 8-7/8 x 3-5/8 x 3-3/4 [225 x 92 x 95] High Oval Funnel
- ___ -11 Vandal-Proof Secured Grate (ZN Only)
- ___ -15 Solid Loose Set Cover
- ___ -19 Full Hinged Grate (ZN Only)
- ___ -23 Aluminum Bucket
- ___ -25 White A.R.C. Bucket
- ___ -31 Stainless Steel Mesh Liner for Bucket
- ___ -32 Aluminum Dome Strainer
- ___ -33 White A.R.C. Anti-Splash Bottom Dome Strainer

* Regularly furnished unless otherwise specified.

Zurn Industries, LLC | Specification Drainage Operation
 1801 Pittsburgh Avenue, Erie, PA U.S.A. 16502 · Ph. 855-663-9876, Fax 814-454-7929
 In Canada | Zurn Industries Limited
 3544 Nashua Drive, Mississauga, Ontario L4V 1L2 · Ph. 905-405-8272, Fax 905-405-1292
www.zurn.com

Rev. J
 Date: 09/28/2017
 C.N. No. 138077
 Prod. | Dwg. No. Z1910

7	PREP SINK TABLE	6" LEGS	REGENCY	600ST3048RT
---	-----------------	---------	---------	-------------

STAINLESS STEEL
WORK TABLE
WITH SINK & UNDERSHELF

ITEM #: _____ QUANTITY: _____

PROJECT: _____

APPROVAL: _____

DATE: _____



FEATURES

- 16-gauge type 304 stainless steel top offers greater durability and corrosion-resistance than type 430
- 18 gauge type 430 stainless steel undershelf and hat channels
- Features a 12" deep stainless steel sink with a deck mounted faucet
- Convenient 5" backsplash protects posterior wall
- Stainless steel legs and sockets for maximum support
- Adjustable bullet feet



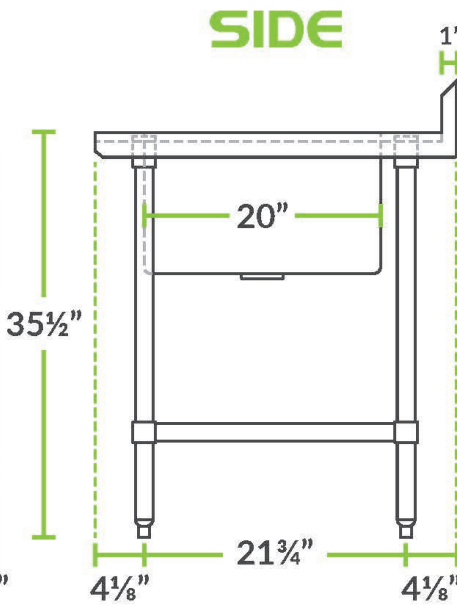
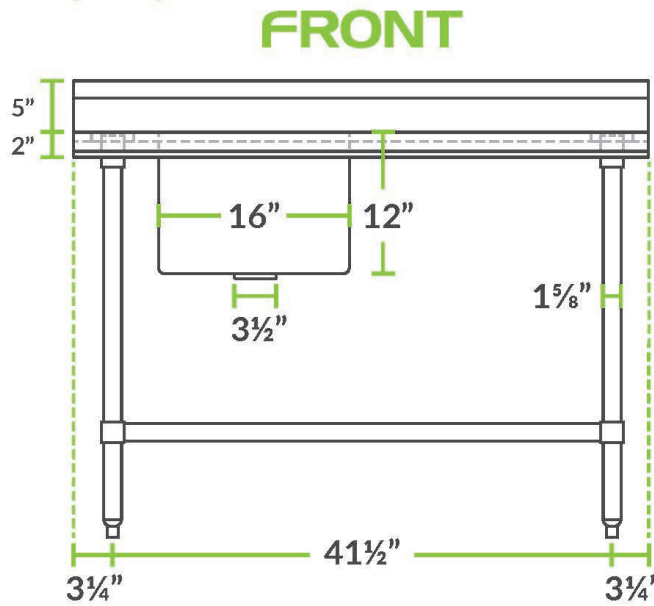
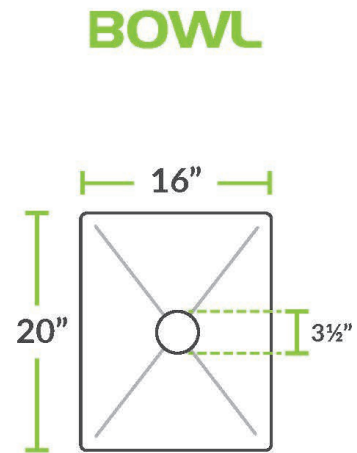
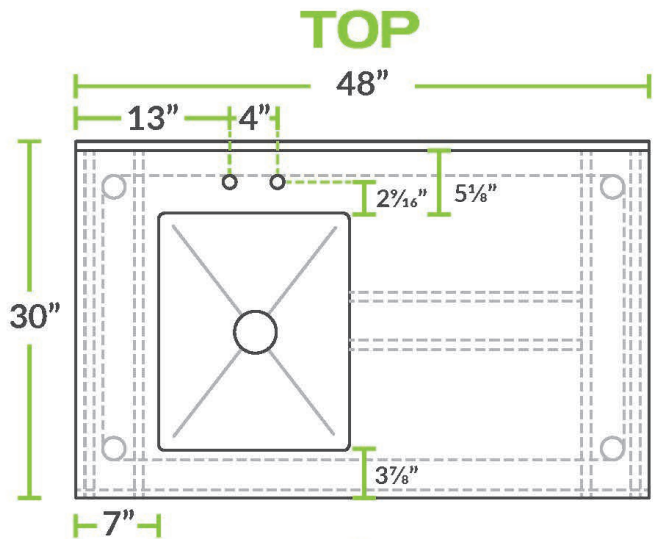
SPECIFICATIONS

ITEM	LENGTH	WIDTH	WORK HEIGHT	TOTAL HEIGHT	BACKSPLASH HEIGHT	BOWL DEPTH	BOWL (F TO B)	BOWL (L TO R)	SINK SIDE
600ST3048LFT	48"	30"	35½"	40½"	5"	12"	20"	16"	Left

02/2019

REGENCYTABLESANDSINKS.COM

**STAINLESS STEEL
WORK TABLE
WITH SINK & UNDERSHELF**



REGENCYTABLESANDSINKS.COM

8	PREP TABLES	6" LEGS	REGENCY	600T2496G
---	-------------	---------	---------	-----------

18 GAUGE STAINLESS STEEL WORK TABLES



FEATURES

- Smooth type 304 stainless steel work surface makes cleaning a breeze
- Galvanized legs & undershelves provide unparalleled stability
- Adjustable bullet feet ensure leveling on uneven surfaces
- Combines unbeatable strength with long-lasting durability

SPECIFICATIONS

ITEM	LENGTH	WIDTH	WORK HEIGHT	UNDERSHELF DIMENSIONS	TOP SHELF CAPACITY	UNDERSHELF CAPACITY	WEIGHT
600T1824G	24"	18"	34"	18" x 12"	350 lb.	260 lb.	30 lb.
600T1830G	30"	18"	34"	24" x 12"	350 lb.	260 lb.	34 lb.
600T1836G	36"	18"	34"	30" x 12"	370 lb.	280 lb.	37 lb.
600T1848G	48"	18"	34"	42" x 12"	390 lb.	300 lb.	45 lb.
600T1860G	60"	18"	34"	54" x 12"	410 lb.	320 lb.	53 lb.
600T1872G	72"	18"	34"	66" x 12"	430 lb.	340 lb.	61 lb.
600T1896G	96"	18"	34"	90" x 12"	570 lb.	410 lb.	92 lb.
600T2424G	24"	24"	34"	18" x 18"	400 lb.	300 lb.	33 lb.
600T2430G	30"	24"	34"	24" x 18"	400 lb.	300 lb.	37 lb.
600T2436G	36"	24"	34"	30" x 18"	430 lb.	320 lb.	41 lb.
600T2448G	48"	24"	34"	42" x 18"	460 lb.	340 lb.	54 lb.
600T2460G	60"	24"	34"	54" x 18"	480 lb.	360 lb.	64 lb.
600T2472G	72"	24"	34"	66" x 18"	500 lb.	380 lb.	78 lb.
600T2484G	84"	24"	34"	78" x 18"	630 lb.	430 lb.	89 lb.
600T2496G	96"	24"	34"	90" x 18"	650 lb.	450 lb.	100 lb.
600T3030G	30"	30"	34"	24" x 24"	440 lb.	330 lb.	40 lb.
600T3036G	36"	30"	34"	30" x 24"	470 lb.	350 lb.	47 lb.
600T3048G	48"	30"	34"	42" x 24"	500 lb.	370 lb.	59 lb.
600T3060G	60"	30"	34"	54" x 24"	520 lb.	390 lb.	71 lb.
600T3072G	72"	30"	34"	66" x 24"	540 lb.	410 lb.	89 lb.
600T3084G	84"	30"	34"	78" x 24"	660 lb.	460 lb.	102 lb.
600T3096G	96"	30"	34"	90" x 24"	680 lb.	480 lb.	113 lb.

NOTE: 84" & 96" Work Tables Feature (6) Six Legs for Added Stability

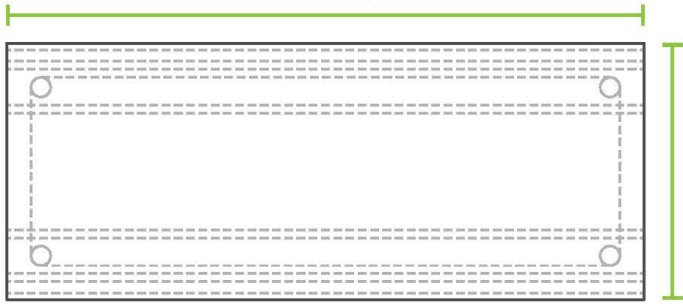
REGENCYTABLESANDSINKS.COM

18 GAUGE STAINLESS STEEL WORK TABLES



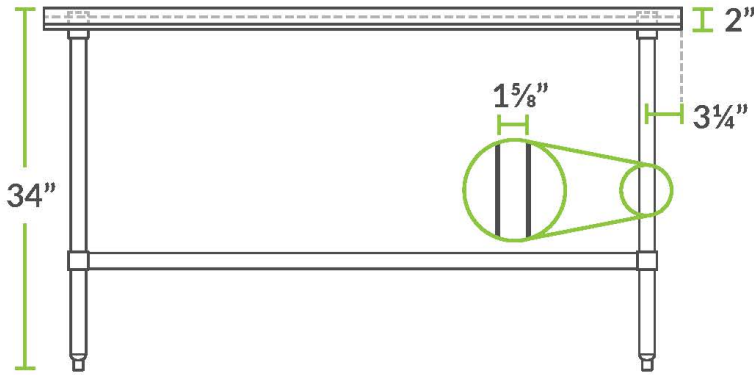
TOP

LENGTH

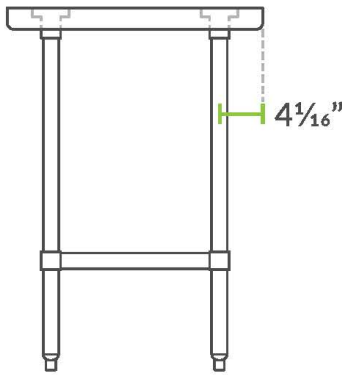


WIDTH

FRONT



SIDE



REGENCYTABLESANDSINKS.COM

ACCESSORIES



CASTERS & FEET

ITEM	DESCRIPTION	# / PACK
600CASTER4	5" Swivel Stem Casters	4
600CASTER6	5" Swivel Stem Casters	6
600CASTERHD4	5" Heavy-Duty Swivel Stem Casters	4
600CASTERHD6	5" Heavy-Duty Swivel Stem Casters	6
600PABF	Adjustable Plastic Bullet Foot	1
600SPABF	Adjustable Stainless Steel Bullet Foot	1
600SSFF	3/4" Stainless Steel Flanged Foot	1

UNDERSHELVES

ITEM	DIMENSIONS	FITS
600UT1824S	18"L x 12"W	24"L x 18"W Work Tables
600UT1830S	24"L x 12"W	30"L x 18"W Work Tables
600UT1836S	30"L x 12"W	36"L x 18"W Work Tables
600UT1848S	42"L x 12"W	48"L x 18"W Work Tables
600UT1860S	54"L x 12"W	60"L x 18"W Work Tables
600UT1872S	66"L x 12"W	72"L x 18"W Work Tables
600UT2424S	18"L x 18"W	24"L x 24"W Work Tables
600UT2430S	24"L x 18"W	30"L x 24"W Work Tables
600UT2436S	30"L x 18"W	36"L x 24"W Work Tables
600UT2448S	42"L x 18"W	48"L x 24"W Work Tables
600UT2460S	54"L x 18"W	60"L x 24"W Work Tables
600UT2472S	66"L x 18"W	72"L x 24"W Work Tables
600UT2484S	78"L x 18"W	84"L x 24"W Work Tables
600UT2496S	90"L x 18"W	96"L x 24"W Work Tables
600UT3030S	24"L x 24"W	30"L x 30"W Work Tables
600UT3036S	30"L x 24"W	36"L x 30"W Work Tables
600UT3048S	42"L x 24"W	48"L x 30"W Work Tables
600UT3060S	54"L x 24"W	60"L x 30"W Work Tables
600UT3072S	66"L x 24"W	72"L x 30"W Work Tables
600UT3084S	78"L x 24"W	84"L x 30"W Work Tables
600UT3096S	90"L x 24"W	96"L x 30"W Work Tables
600UT3636S	30"L x 30"W	36"L x 36"W Work Tables
600UT3648S	42"L x 30"W	48"L x 36"W Work Tables
600UT3660S	54"L x 30"W	60"L x 36"W Work Tables
600UT3672S	66"L x 30"W	72"L x 36"W Work Tables
600UT3696S	90"L x 30"W	96"L x 36"W Work Tables

CASTERS

Each set of Regency casters lets you turn any work table or equipment stand with 4 or 6 standard legs into a mobile work station. With a total weight capacity of 1200 to 1600 lb., these wheels can stand the toughest of tests and are sure to meet your needs. Take your table or equipment on the go and then keep it secure with the flip of a lever, conveniently placed at foot level for easy locking and unlocking.

BULLET FEET

Make sure your table, compartment sink, or dishtable is level and stable by replacing a missing or broken bullet foot with these Regency Bullet Feet! They are designed to fit equipment with 1 1/2" outer diameter legs and are adjustable so they can accommodate uneven floors.

FLANGED FEET

If you need to bolt your Regency equipment to the floor for added stability during use, this flanged 3/8" seismic foot is the perfect solution! It is designed to swap out easily for an existing foot on Regency products with legs that measure 1 1/2" in outer diameter. Feet like these are typically used to comply with local codes, which require you to secure equipment to the floor, and in situations where keeping your equipment immobile could be useful, like on a food truck.



UNDERSHELVES

Add extra storage space and organization to your kitchen with a Regency adjustable stainless steel work table undershelf! Undershelves provide additional storage for frequently used items like prep tools, cutting boards, bar towels, oven mitts, pans, and trays. These undershelves are adjustable, so you can move them higher or lower to accommodate items of varying sizes. Made of 18 gauge, type 430 stainless steel, Regency undershelves ensure maximum durability and corrosion resistance, and are easy to clean and sanitize.



REGENCYTABLESANDINKS.COM

ACCESSORIES



OVERSHELVES

ITEM	TYPE	DIMENSIONS	FITS
600SOS1230	Single Deck	30"L x 12"W x 19¼"H	30"L Work Tables
600SOS1236	Single Deck	36"L x 12"W x 19¼"H	36"L Work Tables
600SOS1248	Single Deck	48"L x 12"W x 19¼"H	48"L Work Tables
600SOS1260	Single Deck	60"L x 12"W x 19¼"H	60"L Work Tables
600SOS1272	Single Deck	72"L x 12"W x 19¼"H	72"L Work Tables
600SOS1284	Single Deck	84"L x 12"W x 19¼"H	84"L Work Tables
600SOS1296	Single Deck	96"L x 12"W x 19¼"H	96"L Work Tables
600SOS1830	Single Deck	30"L x 18"W x 19¼"H	30"L Work Tables
600SOS1836	Single Deck	36"L x 18"W x 19¼"H	36"L Work Tables
600SOS1848	Single Deck	48"L x 18"W x 19¼"H	48"L Work Tables
600SOS1860	Single Deck	60"L x 18"W x 19¼"H	60"L Work Tables
600SOS1872	Single Deck	72"L x 18"W x 19¼"H	72"L Work Tables
600SOS1884	Single Deck	84"L x 18"W x 19¼"H	84"L Work Tables
600SOS1896	Single Deck	96"L x 18"W x 19¼"H	96"L Work Tables
600DOS1230	Double Deck	30"L x 12"W x 32"H	30"L Work Tables
600DOS1236	Double Deck	36"L x 12"W x 32"H	36"L Work Tables
600DOS1248	Double Deck	48"L x 12"W x 32"H	48"L Work Tables
600DOS1260	Double Deck	60"L x 12"W x 32"H	60"L Work Tables
600DOS1272	Double Deck	72"L x 12"W x 32"H	72"L Work Tables
600DOS1284	Double Deck	84"L x 12"W x 32"H	84"L Work Tables
600DOS1296	Double Deck	96"L x 12"W x 32"H	96"L Work Tables
600DOS1830	Double Deck	30"L x 18"W x 32"H	30"L Work Tables
600DOS1836	Double Deck	36"L x 18"W x 32"H	36"L Work Tables
600DOS1848	Double Deck	48"L x 18"W x 32"H	48"L Work Tables
600DOS1860	Double Deck	60"L x 18"W x 32"H	60"L Work Tables
600DOS1872	Double Deck	72"L x 18"W x 32"H	72"L Work Tables
600DOS1884	Double Deck	84"L x 18"W x 32"H	84"L Work Tables
600DOS1896	Double Deck	96"L x 18"W x 32"H	96"L Work Tables

DRAWERS

ITEM	EXTERIOR DIMENSIONS	INTERIOR DIMENSIONS
600DR2015	19½"L x 23¾"W x 5"H	15"L x 20"W x 5"H
600DR2020	25¾"L x 23¾"W x 5"H	20"L x 20"W x 5"H

STAINLESS STEEL OVERSHELVES

Add extra storage space and organization to your kitchen with these Regency stainless steel overshelves! Available in single or double deck, their 18 gauge, type 430 stainless steel construction ensures long-lasting durability to stand up to repeated use. Installation is simple as the whole shelf easily mounts to the end of your table using the "L" brackets, set screws, and wrench provided.



DRAWERS

Keep your kitchen organized by mounting a Regency galvanized steel drawer to the under structure of your work table. Each drawer features an easy-to-clean stainless steel front and moves on ball-bearing sides.



REGENCYTABLESANDSINKS.COM

9	WORK TABLES	6" LEGS	REGENCY	600TSB3060S & 600TSB3072S
---	-------------	---------	---------	---------------------------

16 GAUGE STAINLESS STEEL
WORK TABLES
WITH 4" BACKSPLASH



FEATURES

- Smooth type 304 stainless steel work surface makes cleaning a breeze
- 4" backsplash to protect posterior wall
- Stainless steel legs, undershelf, and hat channels provide unparalleled stability
- Adjustable bullet feet ensure leveling on uneven surfaces
- Combines unbeatable strength with long-lasting durability
- Simple assembly and installation requires little effort

SPECIFICATIONS



ITEM	LENGTH	WIDTH	WORK HEIGHT	UNDERSHELF DIMENSIONS	TOP SHELF CAPACITY	UNDERSHELF CAPACITY	WEIGHT
600TSB2424S	24"	24"	34"	18" x 18"	500 lb.	300 lb.	35 lb.
600TSB2430S	30"	24"	34"	24" x 18"	500 lb.	300 lb.	40 lb.
600TSB2436S	36"	24"	34"	30" x 18"	530 lb.	320 lb.	46 lb.
600TSB2448S	48"	24"	34"	42" x 18"	560 lb.	340 lb.	59 lb.
600TSB2460S	60"	24"	34"	54" x 18"	580 lb.	360 lb.	70 lb.
600TSB2472S	72"	24"	34"	66" x 18"	600 lb.	380 lb.	87 lb.
600TSB2496S	96"	24"	34"	90" x 18"	760 lb.	450 lb.	110 lb.
600TSB3030S	30"	30"	34"	24" x 24"	550 lb.	330 lb.	47 lb.
600TSB3036S	36"	30"	34"	30" x 24"	570 lb.	350 lb.	51 lb.
600TSB3048S	48"	30"	34"	42" x 24"	600 lb.	370 lb.	66 lb.
600TSB3060S	60"	30"	34"	54" x 24"	620 lb.	390 lb.	80 lb.
600TSB3072S	72"	30"	34"	66" x 24"	640 lb.	410 lb.	99 lb.
600TSB3084S	84"	30"	34"	78" x 24"	780 lb.	460 lb.	113 lb.
600TSB3096S	96"	30"	34"	90" x 24"	800 lb.	480 lb.	126 lb.
600TSB3636S	36"	36"	34"	30" x 30"	600 lb.	380 lb.	58 lb.
600TSB3648S	48"	36"	34"	42" x 30"	630 lb.	400 lb.	72 lb.
600TSB3660S	60"	36"	34"	54" x 30"	650 lb.	420 lb.	87 lb.
600TSB3672S	72"	36"	34"	66" x 30"	670 lb.	440 lb.	102 lb.
600TSB3696S	96"	36"	34"	90" x 36"	820 lb.	510 lb.	139 lb.

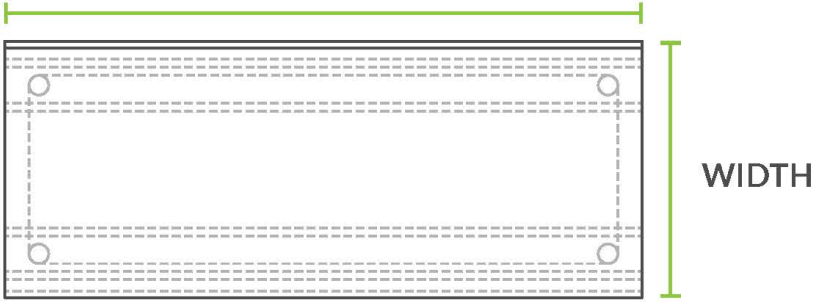
NOTE: 84" & 96" Work Tables Feature (6) Six Legs for Added Stability

REGENCYTABLESANDSINKS.COM

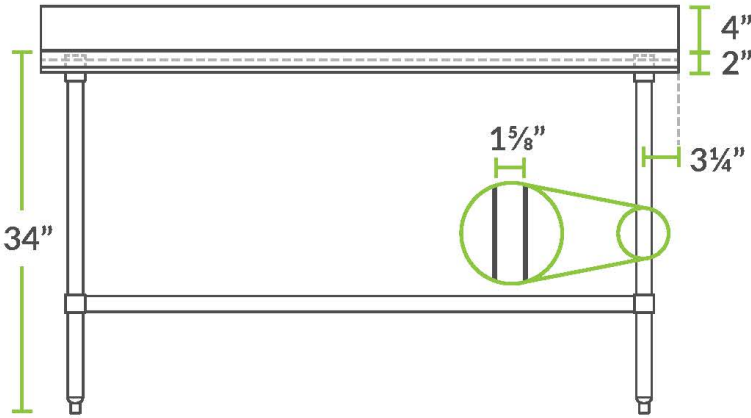
16 GAUGE STAINLESS STEEL
WORK TABLES
WITH 4" BACKSPLASH



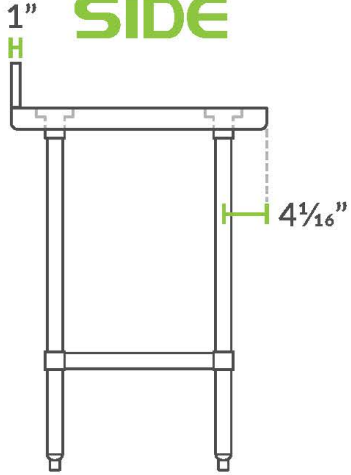
TOP
LENGTH



FRONT



SIDE



REGENCYTABLESANDSINKS.COM

ACCESSORIES



CASTERS & FEET

ITEM	DESCRIPTION	# / PACK
600CASTER4	5" Swivel Stem Casters	4
600CASTER6	5" Swivel Stem Casters	6
600CASTERHD4	5" Heavy-Duty Swivel Stem Casters	4
600CASTERHD6	5" Heavy-Duty Swivel Stem Casters	6
600PABF	Adjustable Plastic Bullet Foot	1
600SPABF	Adjustable Stainless Steel Bullet Foot	1
600SSFF	3/4" Stainless Steel Flanged Foot	1

UNDERSHELVES

ITEM	DIMENSIONS	FITS
600UT1824S	18"L x 12"W	24"L x 18"W Work Tables
600UT1830S	24"L x 12"W	30"L x 18"W Work Tables
600UT1836S	30"L x 12"W	36"L x 18"W Work Tables
600UT1848S	42"L x 12"W	48"L x 18"W Work Tables
600UT1860S	54"L x 12"W	60"L x 18"W Work Tables
600UT1872S	66"L x 12"W	72"L x 18"W Work Tables
600UT2424S	18"L x 18"W	24"L x 24"W Work Tables
600UT2430S	24"L x 18"W	30"L x 24"W Work Tables
600UT2436S	30"L x 18"W	36"L x 24"W Work Tables
600UT2448S	42"L x 18"W	48"L x 24"W Work Tables
600UT2460S	54"L x 18"W	60"L x 24"W Work Tables
600UT2472S	66"L x 18"W	72"L x 24"W Work Tables
600UT2484S	78"L x 18"W	84"L x 24"W Work Tables
600UT2496S	90"L x 18"W	96"L x 24"W Work Tables
600UT3030S	24"L x 24"W	30"L x 30"W Work Tables
600UT3036S	30"L x 24"W	36"L x 30"W Work Tables
600UT3048S	42"L x 24"W	48"L x 30"W Work Tables
600UT3060S	54"L x 24"W	60"L x 30"W Work Tables
600UT3072S	66"L x 24"W	72"L x 30"W Work Tables
600UT3084S	78"L x 24"W	84"L x 30"W Work Tables
600UT3096S	90"L x 24"W	96"L x 30"W Work Tables
600UT3636S	30"L x 30"W	36"L x 36"W Work Tables
600UT3648S	42"L x 30"W	48"L x 36"W Work Tables
600UT3660S	54"L x 30"W	60"L x 36"W Work Tables
600UT3672S	66"L x 30"W	72"L x 36"W Work Tables
600UT3696S	90"L x 30"W	96"L x 36"W Work Tables

CASTERS

Each set of Regency casters lets you turn any work table or equipment stand with 4 or 6 standard legs into a mobile work station. With a total weight capacity of 1200 to 1600 lb., these wheels can stand the toughest of tests and are sure to meet your needs. Take your table or equipment on the go and then keep it secure with the flip of a lever, conveniently placed at foot level for easy locking and unlocking.

BULLET FEET

Make sure your table, compartment sink, or dishtable is level and stable by replacing a missing or broken bullet foot with these Regency Bullet Feet! They are designed to fit equipment with 1 1/2" outer diameter legs and are adjustable so they can accommodate uneven floors.

FLANGED FEET

If you need to bolt your Regency equipment to the floor for added stability during use, this flanged 3/8" seismic foot is the perfect solution! It is designed to swap out easily for an existing foot on Regency products with legs that measure 1 1/2" in outer diameter. Feet like these are typically used to comply with local codes, which require you to secure equipment to the floor, and in situations where keeping your equipment immobile could be useful, like on a food truck.



UNDERSHELVES

Add extra storage space and organization to your kitchen with a Regency adjustable stainless steel table undershelf! Undershelves provide additional storage for frequently used items like prep tools, cutting boards, bar towels, oven mitts, pans, and trays. These undershelves are adjustable, so you can move them higher or lower to accommodate items of varying sizes. Made of 18 gauge, type 430 stainless steel, Regency undershelves ensure maximum durability and corrosion resistance, and are easy to clean and sanitize.



REGENCYTABLESANDINKS.COM

ACCESSORIES



OVERSHELVES

ITEM	TYPE	DIMENSIONS	FITS
600SOS1230	Single Deck	30"L x 12"W x 19¼"H	30"L Work Tables
600SOS1236	Single Deck	36"L x 12"W x 19¼"H	36"L Work Tables
600SOS1248	Single Deck	48"L x 12"W x 19¼"H	48"L Work Tables
600SOS1260	Single Deck	60"L x 12"W x 19¼"H	60"L Work Tables
600SOS1272	Single Deck	72"L x 12"W x 19¼"H	72"L Work Tables
600SOS1284	Single Deck	84"L x 12"W x 19¼"H	84"L Work Tables
600SOS1296	Single Deck	96"L x 12"W x 19¼"H	96"L Work Tables
600SOS1830	Single Deck	30"L x 18"W x 19¼"H	30"L Work Tables
600SOS1836	Single Deck	36"L x 18"W x 19¼"H	36"L Work Tables
600SOS1848	Single Deck	48"L x 18"W x 19¼"H	48"L Work Tables
600SOS1860	Single Deck	60"L x 18"W x 19¼"H	60"L Work Tables
600SOS1872	Single Deck	72"L x 18"W x 19¼"H	72"L Work Tables
600SOS1884	Single Deck	84"L x 18"W x 19¼"H	84"L Work Tables
600SOS1896	Single Deck	96"L x 18"W x 19¼"H	96"L Work Tables
600DOS1230	Double Deck	30"L x 12"W x 32"H	30"L Work Tables
600DOS1236	Double Deck	36"L x 12"W x 32"H	36"L Work Tables
600DOS1248	Double Deck	48"L x 12"W x 32"H	48"L Work Tables
600DOS1260	Double Deck	60"L x 12"W x 32"H	60"L Work Tables
600DOS1272	Double Deck	72"L x 12"W x 32"H	72"L Work Tables
600DOS1284	Double Deck	84"L x 12"W x 32"H	84"L Work Tables
600DOS1296	Double Deck	96"L x 12"W x 32"H	96"L Work Tables
600DOS1830	Double Deck	30"L x 18"W x 32"H	30"L Work Tables
600DOS1836	Double Deck	36"L x 18"W x 32"H	36"L Work Tables
600DOS1848	Double Deck	48"L x 18"W x 32"H	48"L Work Tables
600DOS1860	Double Deck	60"L x 18"W x 32"H	60"L Work Tables
600DOS1872	Double Deck	72"L x 18"W x 32"H	72"L Work Tables
600DOS1884	Double Deck	84"L x 18"W x 32"H	84"L Work Tables
600DOS1896	Double Deck	96"L x 18"W x 32"H	96"L Work Tables

DRAWERS

ITEM	EXTERIOR DIMENSIONS	INTERIOR DIMENSIONS
600DR2015	19½"L x 23¾"W x 5"H	15"L x 20"W x 5"H
600DR2020	25¾"L x 23¾"W x 5"H	20"L x 20"W x 5"H

STAINLESS STEEL OVERSHELVES

Add extra storage space and organization to your kitchen with these Regency stainless steel overshelves! Available in single or double deck, their 18 gauge, type 430 stainless steel construction ensures long-lasting durability to stand up to repeated use. Installation is simple as the whole shelf easily mounts to the end of your table using the "L" brackets, set screws, and wrench provided.



DRAWERS

Keep your kitchen organized by mounting a Regency galvanized steel drawer to the under structure of your work table. Each drawer features an easy-to-clean stainless steel front and moves on ball-bearing sides.



REGENCYTABLESANDSINKS.COM

10	DEMO TABLE W/ MIRROR	6" LEGS	EAGLE	DT3672SE
----	----------------------	---------	-------	----------

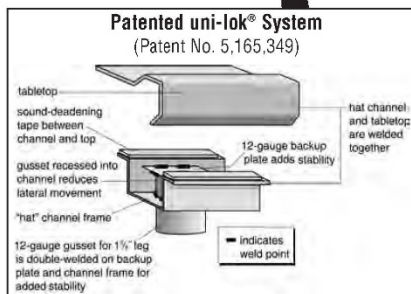
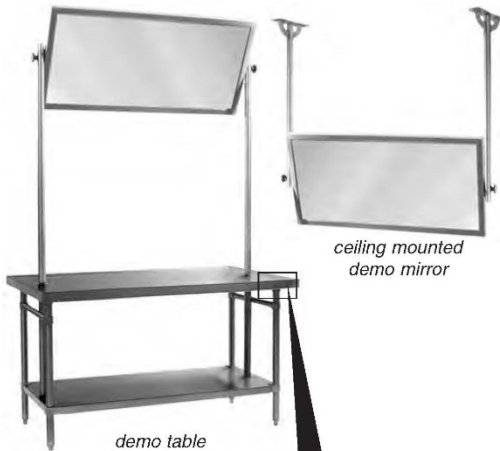


Specification Sheet

Short Form Specifications

Eagle Spec-Master® Demo Table, model _____. Top is 14/304 stainless steel with marine counter edge on all sides. Top reinforced with welded hat channel. Features include stainless steel adjustable undershelf, acrylic mirror supported in tilting frame, and 1½" O.D. stainless steel tubular legs with adjustable stainless steel bullet feet.

Eagle Ceiling Mounted Demo Mirror, model _____. Acrylic mirror supported in tilting frame, and 1½" O.D. stainless steel posts with stainless steel plates. Hardware included.



EAGLE GROUP
 100 Industrial Boulevard, Clayton, DE 19938-8903 USA
 Phone: 302-653-3000 • Fax: 302-653-2065
www.eaglegrp.com

Foodservice Division: Phone 800-441-8440
 MHC/Retail Display Divisions: Phone 800-637-5100

For custom configuration or fabrication needs, contact our **SpecFAB® Division**.
 Phone: 302-653-3000 • Fax: 302-653-3091 • e-mail: specfab@eaglegrp.com

Spec sheets available for viewing, printing or downloading from our online literature library at www.eaglegrp.com

Eagle Foodservice Equipment, Eagle MHC, SpecFAB®, and Retail Display are divisions of Eagle Group. ©2011 by the Eagle Group

Item No.:	_____
Project No.:	_____
S.I.S. No.:	_____

Spec-Master® Demo Tables and Ceiling Mounted Demo Mirrors

MODELS:

- DT3660SE CMM49
 DT3672SE CMM61

Demo Tables

- Tabletop:
 - 14 gauge type 304 stainless steel.
 - 36" (914mm)-wide.
 - Marine counter edge on all sides.
 - Reinforced with welded-on hat channels.
- Undershelf
 - Heavy gauge stainless steel.
 - Adjustable.
- Legs
 - Heavy duty stainless steel.
 - 1½" (41mm)-diameter.
 - Stainless steel gussets.
 - Adjustable stainless steel bullet feet.

Ceiling Mounted Demo Mirrors

- 1½" (41mm)-diameter 16 gauge stainless steel posts (length of posts must be specified when ordering).
- Pair of heavy gauge stainless steel plates.
- Hardware included.

Mirror—on all units

- 24¼" (616mm)-wide.
- Acrylic.
- Supported in tilt framing.
- Locking knob on each side.

Options / Accessories (for Demo Tables only)

- Drawer assemblies
 Casters

Certifications / Approvals



EG10.17 Rev. 03/11

Catalog Specification Sheet No. **EG10.17**

Spec-Master® Demo Tables and Ceiling Mounted Demo Mirrors

EG10.17

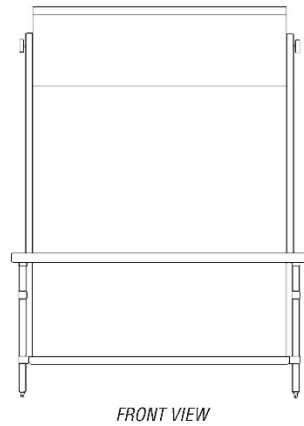
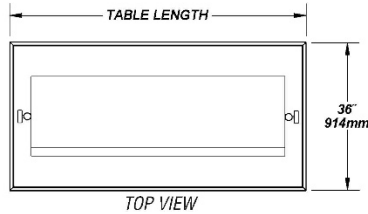
Catalog Specification Sheet No.

Spec-Master® Demo Tables and Ceiling Mounted Demo Mirrors

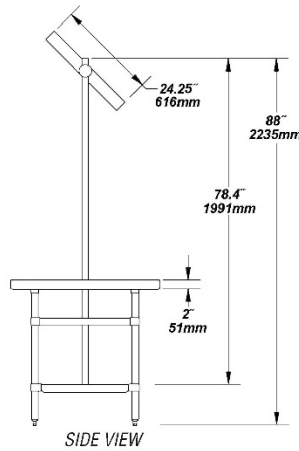


Item No.: _____
 Project No.: _____
 S.I.S. No.: _____

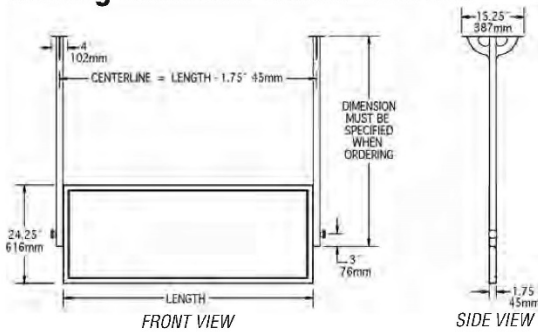
Spec-Master® Demo Tables



model #	TABLE SIZE		MIRROR SIZE		weight	
	width in.	length mm	width in.	length mm	lbs.	kg
DT3660SE	36" x 60"	914 x 1524	24 1/2" x 49 1/2"	616 x 1257	250	113.4
DT3672SE	36" x 72"	914 x 1829	24 1/2" x 61 1/2"	616 x 1562	275	124.7



Ceiling Mounted Demo Mirrors



model #	MIRROR SIZE		weight			
	width in.	length* mm	width in.	length* mm		
CMM49	24 1/2"	616	49 1/2"	1257	90	40.8
CMM61	24 1/2"	616	61 1/2"	1562	115	52.2

* Does not include post length.

EAGLE GROUP
 100 Industrial Boulevard, Clayton, DE 19938-8903 USA
 Phone: 302-653-3000 • Fax: 302-653-2065
 www.eaglegrp.com

Foodservice Division: Phone 800-441-8440
 MHC/Retail Display Divisions: Phone 800-637-5100

Printed in U.S.A.
 ©2011 by Eagle Group
 Rev. 03/11

Spec sheets available for viewing, printing or downloading from our online literature library at www.eaglegrp.com

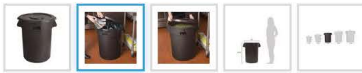
Although every attempt has been made to ensure the accuracy of the information provided, we cannot be held responsible for typographical or printing errors. Information and specifications are subject to change without notice. Please confirm at time of order.

11	TRASH CAN WITH DOLLY	CASTORS	LAVEX	475TC32BRKIT
----	----------------------	---------	-------	--------------

☰ **WebstaurantStore** Account ▾ Cart 0

🔍 Search

< [Brown Commercial Trash Cans](#)
Lavex Janitorial 32 Gallon Brown Round Commercial Trash Can and Lid
Item #: 475TCL32BRKT



Quantity Discounts

Buy in lots of 6 : 📌






\$24.53/Each

Ships free with

Project: 855 East Laurel Drive Emergency Shelter
 Project No. 8875
 Bid No. 10736

SPECS	
Height	27 7/8 Inches
Top Diameter	22 Inches
Capacity	32 Gallons
Color	Brown
Installation Type	Freestanding
Lid Type	Flat Lift-Off
Made in America	Yes
Material	Resin
NSF Listed	Yes
Shape	Round
Style	Stationary
Type	Can / Lid Sets
Weight	10.3 lb.

Other Products from this Line

<i>plus</i>	<i>plus</i>	<i>plus</i>	<i>plus</i>	<i>plus</i>
				
Lavex Janitorial 32 Gallon Brown Round Commercial Trash	Lavex Janitorial 44 Gallon Brown Round Commercial Trash	Lavex Janitorial 55 Gallon Brown Round Commercial Trash	Lavex Janitorial 20 Gallon Brown Round Commercial Trash	Lavex Janitc Gallon Brown Commercial
\$16.99 /Each	\$26.99 /Each	\$42.99 /Each	\$12.99 /Each	\$9.49

Related Items

12	HEATING CABINET	CASTORS	AVANTCO	HPI1836
----	-----------------	---------	---------	---------



PROJECT: _____
 MODEL: _____ SERIAL#: _____
 ITEM #: _____ QUANTITY: _____
 APPROVAL: _____ DATE: _____



Full Size Insulated Heated Holding & Proofing Cabinet

ITEM NUMBERS

#177HPI1836

SPECIAL FEATURES

- Lip-load slides accommodate full size and half size sheet/bun pans with 1½" spacing
- 180° Full-swing clear Lexan door with full length gasket and magnetic door latch
- Fully insulated cabinet
- Integrated, easy-to-read LED display on removable bottom control drawer
- Stainless steel interior and exterior
- Independent heat/proof modes each with 9 dial-adjustable settings, heat up to 185°F and proof up to 115°F between 30-100% humidity level
- Built-in corner bumpers
- NSF Approved 5" front locking and rear non-locking casters



OPTIONS & ACCESSORIES



#177HPCASTWB
5" Swivel Caster with Brake



#177PHCDTRAY
Polycarbonate Drain Pan



#407BUNFULL
Full Size Bun Pan 18" x 26"



#407BUNHALF
Half Size Bun Pan 18" x 13"



#148EXCEL
Stainless Steel Cleaner & Polisher





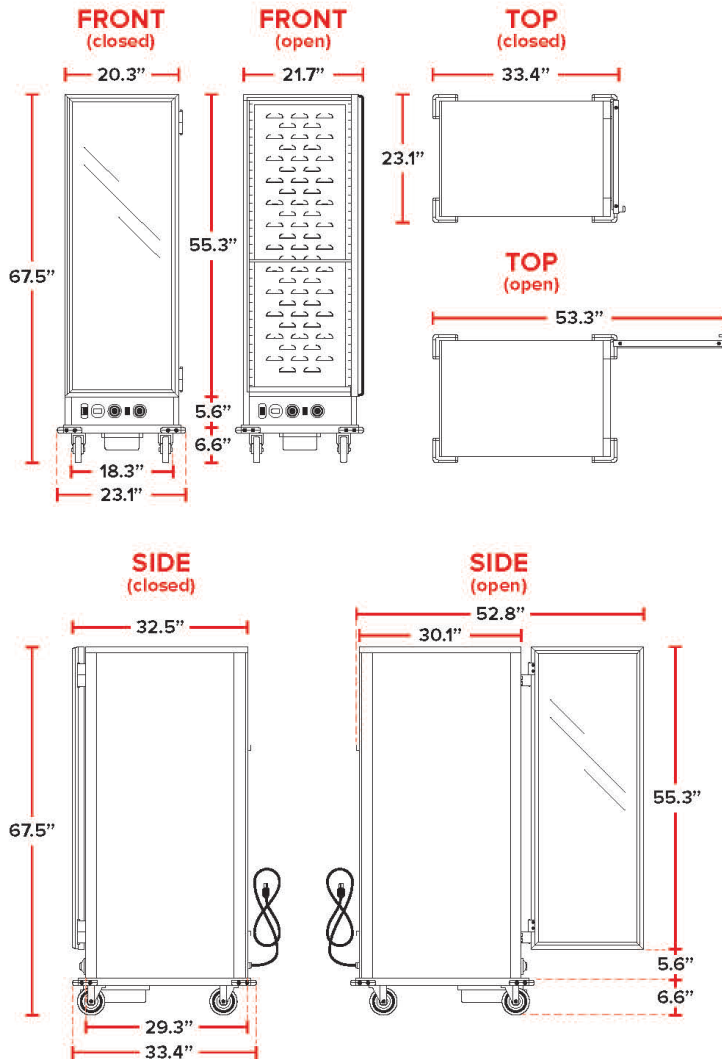
PROJECT: _____

MODEL: _____ SERIAL#: _____

ITEM #: _____ QUANTITY: _____

APPROVAL: _____ DATE: _____

SPECIFICATIONS



TECHNICAL DATA

Overall Width	23.1"
Overall Depth	33.4"
Overall Height	67.5"
Cabinet Width	20.3"
Cabinet Depth	30.1"
Cabinet Height	55.3"
Voltage	120V
Wattage	1440W
Hertz	60Hz
Amps	12 Amps
Phase	1
Insulated	Yes
Control Type	Manual
Heat Mode	9 Settings, up to 185°F
Proof Mode	9 Settings, 30-100%
Door Type	Clear
Slide Type	Lip-load
Full Size (18" x 26") Sheet Pan Capacity	36 Pans
Casters	2 Front Locking 2 Rear Non-Locking

CERTIFICATIONS & MARKINGS



13	HOT/COLD DROP INS	COUNTER MOUNTED	HATCO	HCWI-6DA
----	-------------------	-----------------	-------	----------



COLD or HOT... Ultimate Flexibility in ONE Unit!



Whether it is breakfast in the morning or a salad bar at lunch, this Well incorporates the legendary Hatco quality of both the cold and hot units into one.

- ❄️ Similar to our **Hatco CWB Cold Well**, including the auto-defrost, the easy serviceability, the optimal insulation and an efficient condenser
- 🔥 Utilizes the same time-tested **FR2 Hydro-Heater** (Bain Marie) with the "free flow" technology for an efficient and safe operation with a longer life
 - Simple controls with a seamless well for ease of use and quicker cleanups
 - Adjustable set points to keep your particular food items at optimum temperatures
 - Remote control box that can be mounted to a front counter for easy access (any vertical surface within approximately six feet)



HCWBI-2DA shown with pan supports (included) for the hot mode, designed for easier handling of food pans

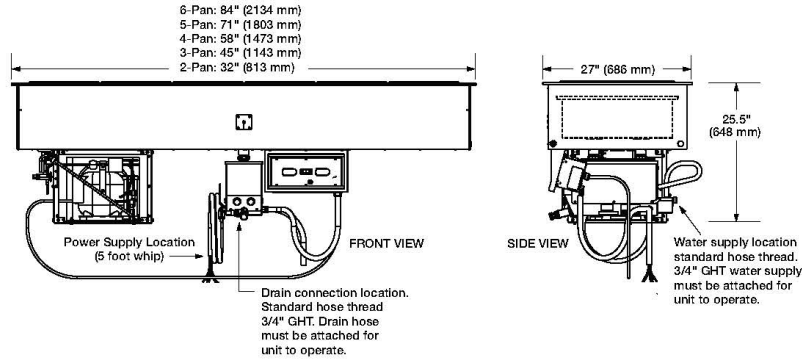


"Cold"-"Off"-"Hot" three position rocker switch, with digital read-outs for either hot or cold modes.

ITEM#



HOT/COLD DROP-IN WELLS
 Models HCWBI-2DA, -3DA, -4DA, -5DA, -6DA



All HCWBI-2DA, -3DA, -4DA, -5DA, -6DA Series

SPECIFICATIONS
 Hot/Cold Full-Size Insulated Top Mount
 Rectangular Models

Model*	Volts	Watts	Amps		Shipping Weight*
			1 Ø	3 Ø	
HCWBI-2DA	120/208	3000	14.5	8.4	201 lbs. (91 kg)
	120/240	3000	12.5	7.3	201 lbs. (91 kg)
HCWBI-3DA	120/208	3000	14.5	8.4	211 lbs. (96 kg)
	120/240	3000	12.5	7.3	211 lbs. (96 kg)
HCWBI-4DA	120/208	4000	19.2	11.2	251 lbs. (114 kg)
	120/240	4000	16.7	9.6	251 lbs. (114 kg)
HCWBI-5DA	120/208	6000	28.8	16.7	301 lbs. (137 kg)
	120/240	6000	25.0	14.5	301 lbs. (137 kg)
HCWBI-6DA	120/208	6000	28.8	16.7	311 lbs. (141 kg)
	120/240	6000	25.0	14.5	311 lbs. (141 kg)

* Model number indicates number of full-size food pans unit will accommodate. "D" added to model name indicates unit with a drain. "A" indicates unit has auto-fill.
 All units: R404A Refrigerant.
 * Approximate shipping weights.
 Ø is the symbol for phase, i.e., single or three phase.

DIMENSIONS

HCWBI-2DA: 32"W x 27"D x 25.5"H (813 x 686 x 648 mm).
 HCWBI-3DA: 45"W x 27"D x 25.5"H (1143 x 686 x 648 mm).
 HCWBI-4DA: 58"W x 27"D x 25.5"H (1473 x 686 x 648 mm).
 HCWBI-5DA: 71"W x 27"D x 25.5"H (1803 x 686 x 648 mm).
 HCWBI-6DA: 84"W x 27"D x 25.5"H (2134 x 686 x 648 mm).

Countertop Cutout Dimensions

Model	Minimum Width	Maximum Width	Minimum Depth	Maximum Depth
HCWBI-2DA	30.13" (765 mm)	31.5" (800 mm)	25.19" (640 mm)	26.5" (673 mm)
HCWBI-3DA	43.13" (1095 mm)	44.5" (1130 mm)	25.19" (640 mm)	26.5" (673 mm)
HCWBI-4DA	56.13" (1426 mm)	57.5" (1461 mm)	25.19" (640 mm)	26.5" (673 mm)
HCWBI-5DA	69.13" (1756 mm)	70.5" (1791 mm)	25.19" (640 mm)	26.5" (673 mm)
HCWBI-6DA	82.13" (2086 mm)	83.5" (2121 mm)	25.19" (640 mm)	26.5" (673 mm)

VOLTAGE

120/208, or 120/240 volts, single phase or optional three phase.
 Export voltages not available.

OPTIONS (NOT FOR RETROFIT)

- Additional Four Year Parts Only Warranty on the Compressor Available at the Time of Unit Purchase
- Three-Phase Wiring, not available for export

ACCESSORIES

- FR2: Flush Hose, Cleaning Brush, Stopper, and Adapter
- 12" (305 mm) and 20" (508 mm) Pan Support Bars
- Full-Size Stainless Steel Food Pans, 2½" (64 mm) deep
- Full-Size Stainless Steel Food Pans, 4" (102 mm) deep
- Full-Size Stainless Steel Food Pans, 6" (152 mm) deep
- Half-Size Stainless Steel Food Pans, 2½" (64 mm) deep
- Third Size Stainless Steel Food Pans, 2½" (64 mm) deep

PRODUCT SPECS
 Hot/Cold Drop-in Well

The Hot/Cold Drop-in Well shall be a Model ... as manufactured by the Hatco Corporation, Milwaukee, WI 53234 U.S.A. With 24/7 parts and service assistance (U.S. and Canada only), the Hot/Cold Drop-In Heated Well shall be rated at ... watts, ... volts, and be ... inches (millimeters) in overall width and be ... inches (millimeters) in overall depth. It shall consist of stainless and aluminized steel housing, electronic control panel (digital temperature display, power light, and 3-position rocker switch (Hot, Off, and Cold), and pan support bars for full-size pans in cold and hot modes. COLD MODE: a condensing unit, sight glass, service valves, receiver, and a dryer/filter. The digital temperature display for the Cold mode will have a set point of 32°F (0°C) and can be adjusted from 10° to 50°F (-12° to 10°C).

HOT MODE: the patented Hatco FR2 (Bain-Marie) shall consist of 1 to 3 stainless steel tubes wrapped with external heating elements. Each tube may be accessed for cleaning purposes. The unit may be emptied easily by a convenient drain and have a low-water cut-off. The digital temperature display for the Hot mode will have a set point of 192°F (89°C) and can be adjusted from 65° to 192°F (18° to 89°C). Accessories may include pan support bars, and stainless steel food pans. One year on-site parts and labor warranty with 24/7 service (US and Canada only). Cold Well: An additional four-year parts only warranty on the compressor available at time of purchase.

HATCO CORPORATION P.O. Box 340500 Milwaukee, WI 53234-0500 U.S.A. • (800) 558-0607 • (414) 671-6350
 Fax (800) 543-7521 • Int'l. Fax (414) 671-3976 • www.hatcocorp.com • E-mail: equipmentsales@hatcocorp.com

Form No. HCWBI Sell Spec Sheet

Printed in U.S.A.
 May 2014

14	SHELVING	6" LEGS	METRO	SUPER ERECTA
----	----------	---------	-------	--------------



Item # _____

Job _____

SUPER ERECTA SHELF® WIRE SHELVING

- **Unique Design:** The open wire design of these shelves minimizes dust accumulation and allows free circulation of air, greater visibility of stored items and greater light penetration.
 - **Durable Construction:** Super Erecta shelves and posts are constructed of heavy-gauge carbon steel or Type 304 stainless steel.
 - **Choice of Finishes:** Super Erecta Brite™ and chrome-plated for dry storage; Metroseal 3™ with Microban® antimicrobial product protection and stainless steel for corrosive environments; and attractive epoxy color options for merchandising applications.
 - **Versatile:** Super Erecta Shelf® wire shelving can adapt to your changing needs. By using various accessories, hundreds of shelving configurations become possible.
 - **Fast, Secure Assembly:** SiteSelect™ Posts have a double groove visual guide feature every 8" (203mm), circular grooves at 1" (25mm) increments, and are numbered at 2" (50mm) intervals. A patented, tapered split sleeve snaps together around each post. Tapered openings in the shelf corners slide over the tapered split sleeves providing a positive lock. Shelf is assembled in minutes without the use of any special tools.
 - **Adjustability:** Shelves can be adjusted at 1" (25mm) intervals along the entire length of the post.
 - **Shelf Ribs:** Run front to back, allowing you to slide items on and off shelves smoothly.
 - **Shelf Accessibility:** Shelves can be loaded/unloaded easily from all sides. This open construction allows maximum use of storage cube.
 - **Adjustable Feet:** Bolt levelers compensate for surface irregularities.
- Note:** Stainless stationary posts are equipped with stainless steel leveling feet.



Wire Shelving

10.01

*MICROBAN® and the MICROBAN® symbol are registered trademarks of the Microban Products Company, Huntersville, NC.

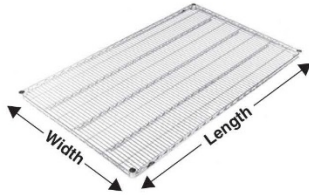


InterMetro Industries Corporation
North Washington Street
Wilkes-Barre, PA 18705
www.metro.com



SUPER ERECTA SHELF®
 WIRE SHELVING

Wire Shelves



Split Sleeve



Aluminum Split Sleeve

- **Metroseal 3:** Metro's proprietary epoxy coating contains Microban® antimicrobial product protection. Microban antimicrobial protects the epoxy coating from bacteria, mold, mildew, and fungus that cause odors, stains, and product degradation.
- See spec sheet 10.14 for epoxy color options.
- Plastic split sleeves are included with each shelf
 Replacements are available: Cat. No. 9985 (bag of 4)
- Aluminum split sleeves are recommended for abusive mobile applications. Sleeves with stainless C-rings must be used for cart wash applications (exceeding 200°F/93°C) and for all autoclave applications.
 Cat. No. 9986Z (bag of 4 with zinc C-rings)
 Cat. No. 9986S (bag of 4 with stainless steel C-rings)
- Weight capacity (evenly distributed) per shelf
 800 lbs. (363kg) for lengths of 18" to 48" (457 to 1219mm)
 600 lbs. (272kg) for lengths of 54" (1370mm) or longer
- Weight capacity (evenly distributed) per unit.
 Stationary shelving units have a maximum load capacity (evenly distributed) of 2,000 lbs. (907kg)
 Mobile units have a maximum capacity of three times the caster load rating up to but not exceeding 1,000 lbs. (453kg) total. Consult the Metro catalog for caster load ratings

Model No. Super Erecta Brite	Model No. Chrome	Model No. Metroseal 3 with Microban®	Model No. Stainless	Nominal Width/Length (In.) (mm)	Approx. Pkd. Wt. (lbs.) (kg)
1424BR	1424NC	1424NK3	1424NS	14x24 355x610	6 2.7
1430BR	1430NC	1430NK3	1430NS	14x30 355x760	7 3.2
1436BR	1436NC	1436NK3	1436NS	14x36 355x914	8 3.6
1442BR	1442NC	1442NK3	1442NS	14x42 355x1066	9 1/2 4.3
1448BR	1448NC	1448NK3	1448NS	14x48 355x1219	10 1/2 4.7
1460BR	1460NC	1460NK3	1460NS	14x60 355x1524	14 6.3
1472BR	1472NC	1472NK3	1472NS	14x72 355x1829	17 7.7
1824BR	1824NC	1824NK3	1824NS	18x24 457x610	7 3.2
1830BR	1830NC	1830NK3	1830NS	18x30 457x760	8 3.6
1836BR	1836NC	1836NK3	1836NS	18x36 457x914	9 1/2 4.3
1842BR	1842NC	1842NK3	1842NS	18x42 457x1066	11 5.0
1848BR	1848NC	1848NK3	1848NS	18x48 457x1219	12 5.4
1854BR	1854NC	1854NK3	1854NS	18x54 457x1370	14 1/2 6.6
1860BR	1860NC	1860NK3	1860NS	18x60 457x1524	17 7.7
1872BR	1872NC	1872NK3	1872NS	18x72 457x1829	20 9.1
2124BR	2124NC	2124NK3	2124NS	21x24 530x610	8 3.6
2130BR	2130NC	2130NK3	2130NS	21x30 530x760	9 4.1
2136BR	2136NC	2136NK3	2136NS	21x36 530x914	11 5.0
2142BR	2142NC	2142NK3	2142NS	21x42 530x1066	12 5.4
2148BR	2148NC	2148NK3	2148NS	21x48 530x1219	14 6.4
2154BR	2154NC	2154NK3	2154NS	21x54 530x1370	16 7.3
2160BR	2160NC	2160NK3	2160NS	21x60 530x1524	18 8.2
2172BR	2172NC	2172NK3	2172NS	21x72 530x1829	24 10.9
2424BR	2424NC	2424NK3	2424NS	24x24 610x610	9 4.1
2430BR	2430NC	2430NK3	2430NS	24x30 610x760	11 5.0
2436BR	2436NC	2436NK3	2436NS	24x36 610x914	13 5.9
2442BR	2442NC	2442NK3	2442NS	24x42 610x1066	15 6.8
2448BR	2448NC	2448NK3	2448NS	24x48 610x1219	16 7.3
2454BR	2454NC	2454NK3	2454NS	24x54 610x1370	19 8.6
2460BR	2460NC	2460NK3	2460NS	24x60 610x1524	21 9.5
2472BR	2472NC	2472NK3	2472NS	24x72 610x1829	26 11.8

Note: 14" (355mm) deep units.
 Free-standing units: Units taller than 63" (1600mm) must be properly fastened to the floor or wall using Metro foot plates or wall brackets.
 Mobile units: maximum allowable post height is 54" (1370mm).

SUPER ERECTA SHELF®
WIRE SHELVING



SiteSelect™ Posts

Stationary Posts

Stationary posts are equipped with a leveling bolt to account for uneven floors.

- Height includes leveling bolt (completely tightened) and post cap. Leveling bolt can be adjusted 1/2" (13mm).
- Foot plates may be ordered separately and installed in place of leveling foot.
- Replacement leveling bolts
Zinc Cat. No. RPF04-004 Stainless Steel Cat. No. RPF04-004C
- Replacement post cap for standard posts
Black Cat. No. RPC06-035



SiteSelect Posts feature double grooves every 8" (203mm) to aid assembly.

Model No. Chrome	Model No. Metroseal 3 with Microban	Model No. Stainless Steel	Height		Approx. Pkd. Wt.	
			(in.)	(mm)	(lbs.)	(kg)
7P	7PK3		7 ⁷ / ₈	187	1/2	0.3
13P	13PK3	13PS	14 ³ / ₈	365	1	0.5
27P	27PK3	27PS	28 ³ / ₈	720	1 ³ / ₄	0.75
33P	33PK3	33PS	34 ³ / ₈	873	2	0.9
54P	54PK3	54PS	54 ⁷ / ₁₆	1382	3	1.4
63P	63PK3	63PS	62 ⁷ / ₁₆	1585	3 ¹ / ₂	1.6
74P	74PK3	74PS	74 ¹ / ₂	1892	4	1.8
86P	86PK3	86PS	86 ¹ / ₂	2197	5	2.3
*96P			96 ¹ / ₂	2450	5 ¹ / ₂	2.5

*96P should not be used on units less than 24" (610mm) deep. Consult Metro Engineering for alternate recommendations.



Stationary Post

Mobile Posts (For use with Stem Casters)

- Height includes post cap.

Model No. Chrome	Model No. Metroseal 3 with Microban	Model No. Stainless Steel	Height		Approx. Pkd. Wt.	
			(in.)	(mm)	(lbs.)	(kg)
13UP	13UPK3	13UPS	13 ³ / ₄	349	1	0.5
27UP		27UPS	27 ³ / ₄	704	1 ³ / ₄	0.75
33UP	33UPK3	33UPS	33 ³ / ₄	857	2	0.9
54UP	54UPK3	54UPS	53 ³ / ₁₆	1366	3	1.4
63UP	63UPK3	63UPS	61 ³ / ₁₆	1570	3 ¹ / ₂	1.6
	70UPK3		69 ³ / ₄	1771	3 ³ / ₄	1.7
74UP	74UPK3	74UPS	73 ³ / ₈	1876	4	1.8
86UP	86UPK3	86UPS	85 ³ / ₈	2181	4.5	2.0



Post for Stem Caster

Staked Posts (For use with Truck Dollies)

- Each post connects to the truck dolly through the stem receptacle. The stem receptacle is staked into the bottom of the post to ensure a durable connection in abusive mobile applications.
- Each includes a leveling/connecting bolt.

Model No. Chrome	Model No. Stainless Steel	Height		Approx. Pkd. Wt.	
		(in.)	(mm)	(lbs.)	(kg)
54P-STKD	54PS-STKD	54 ⁷ / ₁₆	1382	3	1.4
63P-STKD	63PS-STKD	62 ⁷ / ₁₆	1585	3 ¹ / ₂	1.6
74P-STKD	74PS-STKD	74 ¹ / ₂	1892	4	1.8



Staked Post

Swaged Posts (For use with Stem Casters in Cart Wash Applications)

- Each post has an aluminum cap swaged into the top of the post.

Model No. Stainless Steel	Height		Approx. Pkd. Wt.	
	(in.)	(mm)	(lbs.)	(kg)
33UPS-SW	33 ³ / ₄	857	2	0.9
54UPS-SW	53 ³ / ₁₆	1366	3	1.4
63UPS-SW	61 ³ / ₁₆	1570	3 ¹ / ₂	1.6



Swaged Post

Special Length Posts

Special length cut posts are available. Consult your Metro representative for more information.

10-01

Job _____



**SUPER ERECTA SHELF®
 WIRE SHELVING**

Super Wide Shelving

- **High-density Storage:** Super Wide™ shelves have a greater storage area for holding large quantities of supplies, especially large, bulky objects, providing maximum storage in minimum space.
- **Load Capacity** (evenly distributed) per shelf:
 Depths: 30" and 36" (760 and 914mm)
 800 lbs. (363kg) for lengths 48" (1219mm) or shorter.
 600 lbs. (272kg) for lengths 54" (1370mm) or longer.



Model No. Chrome	Model No. Metroseal 3 with Microban	Model No. Stainless Steel	Nominal Width/Length (in.) (mm)		Approx. Pkd. Wt. (lbs.) (kg)	
3036NC	3036NK3	3036NS	30x36	760x914	15	6.8
3048NC	3048NK3	3048NS	30x48	760x1219	21	9.5
3060NC	3060NK3	3060NS	30x60	760x1524	26 1/2	11.8
3072NC	3072NK3	3072NS	30x72	760x1829	31	14.0
3636NC	3636NK3	3636NS	36x36	910x914	18	8.2
3648NC	3648NK3	3648NS	36x48	910x1219	23	10.4
3660NC	3660NK3	3660NS	36x60	910x1524	29	13.1
3672NC	3672NK3	3672NS	36x72	910x1829	34 1/2	15.4

Foot Plates

- Use to bolt units to the floor, or when a broader, more stable foot is desired. Foot plates also help to protect floors by distributing the point load of the shelving unit across a larger contact point.
- Foot plates (completely tightened) add 1/8" (3mm) to the specified heights of each stationary post on the table.
 Zinc Cat. No. 9993Z
 Stainless Steel Cat. No. 9993S



"S" Hook

- Used to add on shelving units with only two posts required. Order two per shelf level.
 Cat. No. 9995Z



Wire Shelving



All Metro Catalog Sheets are available on our website: www.metro.com



InterMetro Industries Corporation
 North Washington Street, Wilkes-Barre, PA 18705
 Phone: 570-825-2741
 Product Information, U.S. and Canada: 1.800.992.1776
 Outside U.S. and Canada: www.metro.com/contactus

Printed in U.S.A. L02-006e
 Rev. 1/15

Information and specifications are subject to change without notice. Please confirm at time of order

Copyright © 2015 InterMetro Industries Corp.

15	MIXER	STAND	HOBART	HL600
----	-------	-------	--------	-------

Item # _____
 Quantity _____

C.S.I. Section 11400



701 S Ridge Avenue, Troy, OH 45374
 1-888-4HOBART • www.hobartcorp.com

LEGACY® HL600 MIXER



STANDARD FEATURES

- Heavy-Duty 2.7 H.P. Motor
- Gear Transmission
- Four Fixed Speeds Plus Stir Speed
- Shift-on-the-Fly™ Controls
- Patented soft start Agitation Technology
- 20-Minute SmartTimer™
- Automatic Time Recall
- Large, Easy-To-Reach Controls
- Single Point Bowl Installation
- Ergonomic Swing-Out Bowl
- Power Bowl Lift
- #12 Taper Attachment Hub
- Open Base
- Stainless Steel Bowl Guard
- Metallic Gray Hybrid Powder Coat Finish

MODELS

- HL600 – 60-Quart All Purpose Mixer
- HL600C – 60-Quart All Purpose Mixer with Maximum Security Correctional Package

Specifications, Details and Dimensions on Inside and Back.



ACCESSORY PACKAGE - featuring Hobart Quick Release™ Agitators

- Standard Accessory Package Includes:**
 - 60 Quart Stainless Steel Bowl
 - 60 Quart "B" Beater
 - 60 Quart "D" Wire Whip
 - 60 Quart "ED" Dough Hook



**LEGACY®
 HL600 MIXER**



701 S Ridge Avenue, Troy, OH 45374
 1-888-4HOBART • www.hobartcorp.com

SOLUTIONS/BENEFITS

2.7 H.P. Motor

- Durability
 ■ Heavy-duty to meet the most demanding operations

Gear Transmission

- Durability, Reliability
 ■ Ensures consistent performance and minimum downtime under heavy loads

Four Fixed Speeds plus Stir Speed

- Flexibility, Reliability, Consistency
 ■ For incorporating, blending, mixing ingredients
 ■ Supports consistent results and thorough mixing

Shift-on-the-Fly™ Controls

- Flexibility
 ■ Allows operator to change speeds while mixer is running

Patented soft start Agitation Technology

- Sanitation
 ■ Each speed has a soft transition into a higher speed to reduce the chances of product splash-out

20-Minute SmartTimer™

- Convenience, Ease of Use, Consistency
 ■ Supports recipe mixing times
 ■ Provides accurate results and eliminates overmixing

Automatic Time Recall

- Productivity, Consistency
 ■ Remembers the last time set for each speed
 ■ Great for multiple batches

Ergonomic Swing-Out Bowl

- Ease of Use, Convenience
 ■ Easy loading and unloading of products
 ■ Single Point Bowl Installation allows for simple mounting and removal of bowl
 ■ Bowl Lock ensures mixer bowl is properly in place for mixer to operate

Stainless Steel Bowl Guard

- Protection
 ■ Safety interlock prevents operation when front portion of guard is out of position

Hobart Accessories

- Durability, Flexibility, Simplicity
 ■ Hobart Quick Release™ agitators allow for simple installation and removal from agitator shaft
 ■ Hobart accessories are designed for long-term usage under heavy-duty conditions
 ■ Large array of accessories provide multiple uses for recipe and product processing

HL600 MIXER CAPACITY CHART

Recommended Maximum Capacities - dough capacities based on 70°F. water and 12% flour moisture.

PRODUCT	AGITATORS SUITABLE FOR OPERATION	HL600
CAPACITY OF BOWL (QTS. LIQUID)		60
Egg Whites	D	2 qts.
Mashed Potatoes	B & C	40 lbs.
Mayonnaise (Qts. of Oil)	B or C or D	18 qts.
Meringue (Qts. of Water)	D	1½ qts.
Waffle or Hot Cake Batter	B	24 qts.
Whipped Cream	D or C	12 qts.
Cake, Angel Food (8-10 oz. cake)	C or I	45
Cake, Box or Slab	B or C	50 lbs.
Cake, Cup	B or C	60 lbs.
Cake, Layer	B or C	60 lbs.
Cake, Pound	B	55 lbs.
Cake, Short (Sponge)	C or I	45 lbs.
Cake, Sponge	C or I	36 lbs.
Cookies, Sugar	B	40 lbs.
Dough, Bread or Roll (Lt.-Med.) 60% AR	§ ED	80 lbs.*
Dough, Heavy Bread 55% AR	§ ED	60 lbs.*
Dough Pie	B & P	50 lbs.
Dough, Thin Pizza 40% AR (max. mix time 5 min.)	§‡ ED	40 lbs.□
Dough, Med. Pizza 50% AR	§‡ ED	70 lbs.□
Dough, Thick Pizza 60% AR	§‡ ED	70 lbs.*
Dough, Raised Donut 65% AR	ED	30 lbs.†
Dough, Whole Wheat 70% AR	ED	70 lbs.
Eggs & Sugar for Sponge Cake	B & C or I	24 lbs.
Icing, Fondant	B	36 lbs.
Icing, Marshmallow	C or I	5 lbs.
Shortening & Sugar, Creamed	B	48 lbs.
Pasta, Basic Egg Noodle (max. mix time 5 min.)	ED	30 lbs.

NOTE: % AR (% Absorption Ratio) - Water weight divided by flour weight. Capacity depends on moisture content of dough. Above capacities based on 12% flour moisture at 70°F water temperature.

□ 1st Speed

* 2nd Speed

† 3rd Speed

§ If high gluten flour is used, reduce above dough batch size by 10%.

‡ 2nd Speed should never be used on 50% AR or lower products.

USE OF ICE REQUIRES A 10% REDUCTION IN BATCH SIZE.

1 gallon of water weighs 8.33 lbs.

NOTE: Attachment hub should not be used while mixing.



701 S Ridge Avenue, Troy, OH 45374
 1-888-4HOBART • www.hobartcorp.com

**LEGACY®
 HL600 MIXER**

SPECIFICATIONS

MOTOR:

2.7 H.P. high torque motor.

200-240/50/60/3/1	18.0 (1 Phase) Amps
	10.0 (3 Phase) Amps
380-460/50/60/3	6.5 Amps

ELECTRICAL:

200-240/50/60/3/1, 380-460/50/60/3 – UL Listed.

CONTROLS:

Magnetic contactor with thermal overload protection. Internally sealed “Start-Stop” and Power Bowl Lift push buttons. Reduced voltage pilot circuit transformer is supplied for 380-460/50/60/3 machines. A 20-minute SmartTimer™ is standard. SmartTimer™ includes **Automatic Time Recall**, which remembers the last time set for each speed.

TRANSMISSION:

A rated 5.4 H.P. poly-V belt transfers power from motor to the input shaft then geared down to desired reduction with a constant gear mesh. Gears and shafts are heat-treated hardened alloy steel along with anti-friction ball bearings. Circulating oil and grease lubricants furnished to all gears and shafts.

SPEEDS:

	Agitator (RPM)	Attachment (RPM)
Stir	36	71
First	71	138
Second	123	241
Third	206	401
Fourth	362	707

BOWL GUARD:

Heavy-duty stainless steel wire front and solid stainless steel rear portion. Front portion of guard rotates easily to add ingredients and install or remove agitator. It detaches in seconds for cleaning in dishwasher or sink. Rear portion of guard can be quickly cleaned in position. Guard must be in closed position before mixer will operate. Bowl support interlock provides further protection.

POWER BOWL LIFT:

Powered by an electric motor, the bowl may be raised or lowered by fingertip control through the conveniently located switch. Bowl will remain in position until switch is activated. **Stir-on-Lift Feature:** Allows the agitator to run in Stir Speed while the mixer bowl is being raised. Once the bowl is in the raised position, the mixer automatically shifts into the preselected speed.

FINISH:

Metallic Gray Hybrid Powder Coat finish.

FOOTPADS:

Neoprene footpads are standard.

ATTACHMENT HUB:

Comes with front-mounted Hobart standard #12 taper attachment hub for use with #12 size attachments.

ATTACHMENTS AND ACCESSORIES:

The following are available at extra cost:

- | | |
|--------------------------|-------------------------|
| Stainless Steel Bowl | Bowl Splash Cover |
| “B” Flat Beater | Bowl Scraper |
| “C” Wing Whip | Bowl Truck |
| “D” Wire Whip | 40 Quart Accessories |
| “ED” Dough Hook | Ingredient Chute |
| “P” Pastry Knife | 9" Vegetable Slicer |
| “I” Heavy Duty Wire Whip | Meat Chopper Attachment |
| Bowl Extension Ring | |



Hobart Bowl Scraper

Hobart Ingredient Chute



Listed by Underwriters Laboratories Inc. and certified by NSF International.

**LEGACY®
 HL600 MIXER**



701 S Ridge Avenue, Troy, OH 45374
 1-888-4HOBART • www.hobartcorp.com

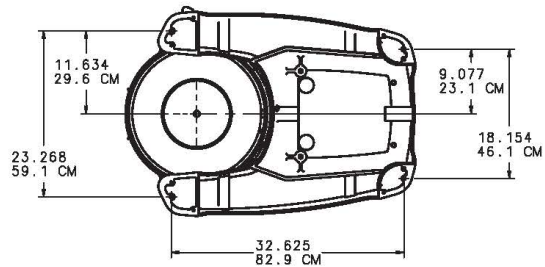
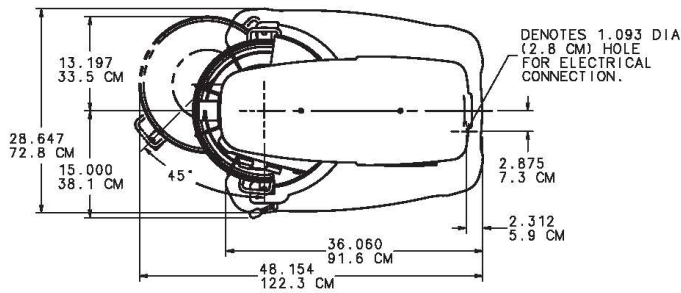
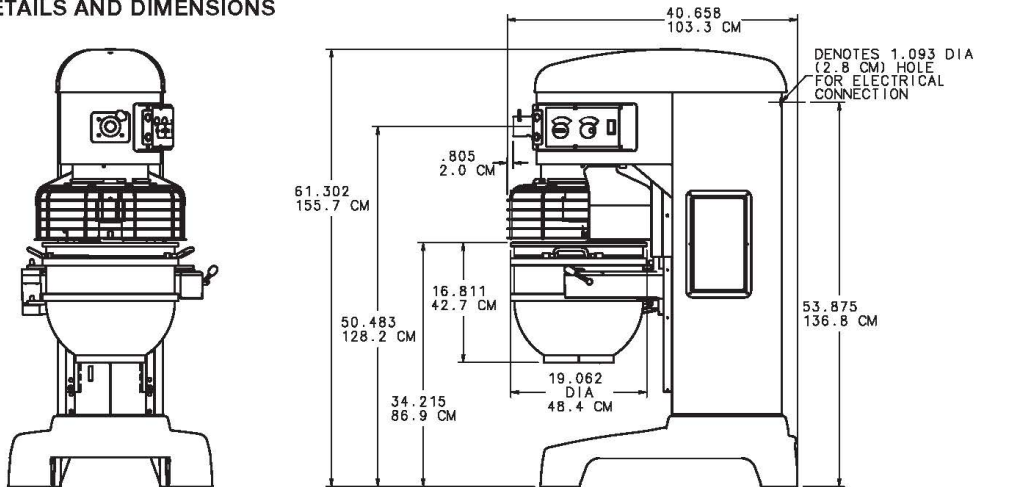
SPECIFICATIONS

ELECTRICAL SPECIFICATIONS: 200-240/50/60/3/1,
 380-460/50/60/3 – UL Listed.

WEIGHT: 866 lbs. net; 916 lbs. domestic shipping.

WARRANTY: Unit has full one-year warranty on parts,
 labor and mileage against manufacturer's defects.
 Service contracts are available.

DETAILS AND DIMENSIONS



WARNING

ELECTRICAL AND GROUNDING CONNECTIONS
 MUST COMPLY WITH THE APPLICABLE
 PORTIONS OF THE NATIONAL ELECTRICAL
 CODE AND/OR OTHER LOCAL ELECTRICAL CODES.

STANDARD MODEL:

NET WT (BOWL INCLUDED) 905 LBS (411.4 KG)
 DOMESTIC SHIPPING WT (BOWL INCLUDED) 955 LBS (434.1 KG)
 BOWL WT 39 LBS (17.7 KG)–REF

As continued product improvement is a policy of Hobart, specifications are subject to change without notice.

16	PAN RACKS	CASTORS	CRES COR	252-DR-36
----	-----------	---------	----------	-----------



JOB: _____

ITEM NO: _____

EXTRUDED SIDEWALL PAN DRYING RACK MODEL 252-DR-36

FEATURES AND BENEFITS:

- Durable pan drying rack for drying and transport of (36) 18" x 26" pans.
- Fully welded framework of structural aluminum extrusions for rigidity and durability.
- Constructed of non-corrosive, Hi-Tensile aluminum for strength.
- Easy to clean; interlocking, extruded sidewalls hold pans on 1-1/2" centers. Provides added strength.
- Offers complete flexibility for operator's selection of pan spacing.
- Supplied with three raised wire grids.
- Heavy duty 5" swivel casters, two with brakes. Provides mobility when fully loaded.

Note: Designed to hold standard 18 x 26" pans by the lip. Due to the variability of pan manufacturers/quality of pans being held/pan sizes, please contact manufacturer or provide a sample pan to ensure a proper fit.



252-DR-36



ACCESSORIES and OPTIONS (Available at extra cost):

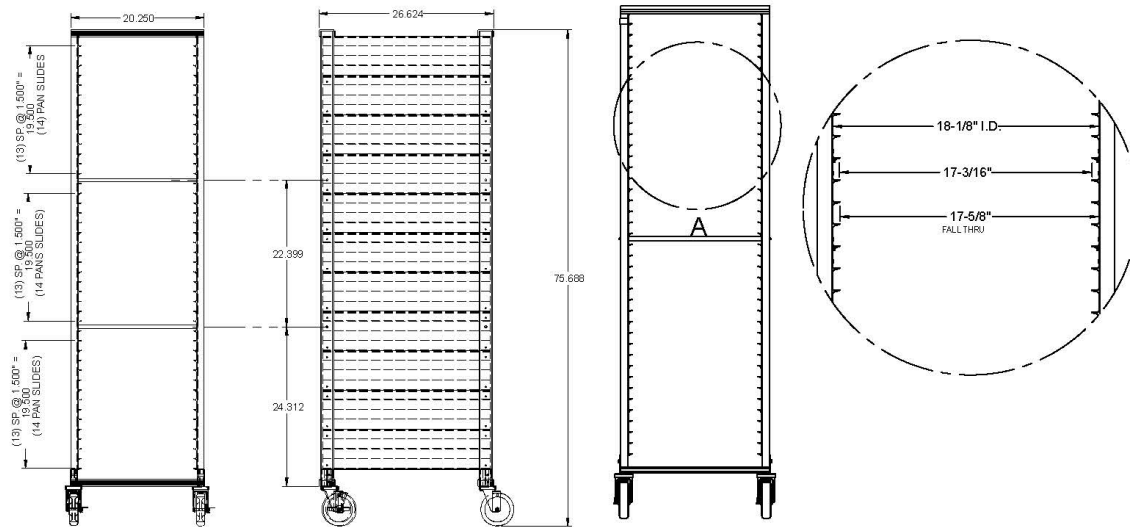
- Pan Stop
- Corner Bumpers
- Vertical Bumpers
- Perimeter Bumper
- Rotary Bumpers (for use with 5" casters)
- Floor Lock (for use with 5" casters)
- Various Caster Options

See page G-36 for accessory details.


5925 Heisley Road • Mentor, OH 44060-1833
Phone: 877/CRESCOR • Fax: 440/350-7267
www.crescor.com

Page G-7.1
Jan., 2017

252-DR-36



CRES COR MODEL NO.	PAN			DIM "A"	DIM "B"	DIM "C"	INSIDE DIMENSIONS				WEIGHT ACT.
	CAP	SIZE		WIDTH	DEPTH	HEIGHT	WIDTH	DEPTH	HEIGHT		
252-DR-36	36	18 X 26	IN	21-5/16	26-5/8	75-11/16	18-1/8	26	67-1/2	LBS	70
		460 X 660	MM	560	680	1922	460	660	1715	KG	32

When ordering bumpers, add 2" to overall dimensions.

ALL ALUMINUM CONSTRUCTION IS RIVETED, WELDED AND FINISHED.

RACK:

- Posts: Extruded channels, 1 x 2 x .125.
- Top and bottom: Extruded channels, 1-1/16 x 2-3/8 x .188; welded to posts.
- Tie rods (4): Two front and back; 5/16 dia. steel rods enclosed in aluminum tubing, fastened to posts.
- Sides: Interlocking extruded 6" panels, smooth outer sides; riveted to posts.
- Casters: 5" dia., swivel, modulus tires, 1-1/4 wide, load cap. 250 lbs., temp. range: -45°+180°F. Delrin bearings.
- Two casters equipped with brakes.

PAN SLIDES:

- Eleven 6" extruded interlocking side wall panels act as pan slides on 1-1/2" centers.
- Holds (36) 18" x 26" bun pans vertically.
- Grids (3): Nickel chrome plated steel, raised wire 17" x 25".

Note: Designed to hold standard 18 x 26" pans by the lip. Due to the variability of pan manufacturers/quality of pans being held/pan sizes, please contact manufacturer or provide a sample pan to ensure a proper fit.



Scan QR code to view Spec Sheet, Operating Manual, Wiring Diagram or to call Customer Service.
 If you need a QR reader visit your App Store on your Smartphone or Tablet.

CRES COR.
 5925 Heisley Road • Mentor, OH 44060-1833
 Phone: 877/CRESCOR • Fax: 440/350-7267
 www.crescor.com
 © Crescent Metal Products, Inc. 2017 All rights reserved.

SHORT FORM SPECIFICATIONS

Cres Cor Pan Drying Rack Model 252-DR-36. Extruded aluminum welded construction. Tie rods (2) applied at front and rear. Interlocking extruded sides for drying (36) 18" x 26" pans. 5" swivel modulus casters, Delrin bearings. Load capacity 250 lbs. each, temperature -45° to +180°F. 2-Year Parts / 1-Year Labor warranty. Provide the following accessories: _____
 NSF listed.

In line with its policy to continually improve its products, CRES COR reserves the right to change materials and specifications without notice.



Made in America Since 1936

17	POT RACK SHELF	WALL MOUNTED	REGENCY	600PS1572
----	----------------	--------------	---------	-----------

Technical drawing of a pot rack shelf. The main view shows a 72" long shelf with 18 hooks. Dimensions include a 1 1/2" height from the wall to the top of the shelf, a 3" height from the wall to the bottom of the shelf, and a 9.525mm gap between the shelf and the wall. An exploded view shows the shelf, a 0.187" x 2" bar, and a bracket. A detail view shows a 15" wide shelf with a 7 1/2" depth and a 1 1/2" height. The shelf is 2" wide at the top and bottom, and 12" high. The bar is 2" wide and 1 1/2" high.

Pot rack with shelf 15"X72"
18GA.430S/S shelf and brackets
0.187"X2" 430S/S bar
18pcs hooks
carton box packing

600PS1572



18	GRIDDLE AND STAND	6" LEGS	GARLAND	GTGG48-GT48M
----	-------------------	---------	---------	--------------



G Series 48" Gas Restaurant Range

Project _____
 Item _____
 Quantity _____
 CSI Section 11400
 Approved _____
 Date _____

Models

- G48-8RS • G48-6G12RS • G48-4G24RS • G48-2G36RS • G48-G48RS
- G48-8SS • G48-6G12SS • G48-4G24SS • G48-2G36SS • G48-G48SS
- G48-8LL • G48-6G12LL • G48-4G24LL • G48-2G36LL • G48-G48LL



Model G48-8LL

Standard Features

- Large 27" (686mm) work top surface
- Stainless steel front and sides
- Stainless steel 5" (127mm) plate rail
- Stainless steel backguard, w/removable stainless steel shelf
- 12" (305mm) section stamped drip trays w/ dimpled bottom
- 6" (152mm) adj. stainless steel legs
- Large easy-to-use control knobs
- Gas regulator

Standard on Applicable Models:

- Open storage base in lieu of oven.
- Ergonomic split cast iron top ring grates
- 33,000 Btuh/ 9.67 kW 2 piece cast iron Starfire- Pro open top burner
- 5/8" (15mm) thick steel griddle plate w/manual hi/lo valve control, 23" (584mm) working depth surface, Standard on right, optional on left
- 4-1/4" (108mm) wide grease trough
- 18,000 Btuh/5.27 kW cast iron "H" style griddle burner per 12"(305mm) width of griddle
- 32,000 Btuh/ 9.38 kW (space saver) or 38,000 Btuh/ 11.13 kW cast iron "H" style oven burner
- Snap action modulating oven thermostat low to 500° F
- Porcelain oven interior, std. oven fits sheet pans 18x26 in both directions

- Nickel plated oven rack and 3-position removable oven rack guide
- Strong, keep-cool oven door handle
- Convection oven w/3 nickel plated oven racks and removable rack guides in lieu of standard oven w/ 1/3HP 120v 60 Hz single phase fan motor; change Suffix RS to CS

Options & Accessories

- Convection oven motor 240v 50/60HZ single phase
- Snap action modulating griddle control 175° to 425° F
- Hot top 12" (305mm) plate in lieu of two open burners, manual valve controlled w/18,000 Btuh/5.27 kW cast iron "H" burner standard on left side
- Low profile 9-3/8" (238mm) backguard stainless steel front and sides
- Additional oven racks
- 6" (152mm) levelling swivel casters (4), w/front locking
- Flanged deck mount legs
- Celsius temperature dials
- Piezo spark ignition for pilots on griddles

Specifications

Gas restaurant series range with 2 space saver ovens, 20" (508mm) wide or large capacity oven 26-1/4" (667mm) wide, 47-1/4" wide, 27" (686mm) deep work top surfaces. Stainless steel front, sides and 5" wide front rail. 6" (152mm) legs with adjustable feet. Eight Starfire-Pro 2 piece, 33,000 Btuh/ 9.67 kW (natural gas), cast open burners set in split cast iron ergonomic grates. Griddle or optional hot top with cast iron "H" style burners, 18,000 Btuh/5.27 kW (natural gas), in lieu of open burners. One piece oven with porcelain interior and heavy duty, "keep cool" door handle. Heavy cast iron "H" oven burner rated 32,000 Btuh/ 9.38 kW (natural gas) for space saver oven, and 38,000 Btuh/11.13 kW (natural gas) for standard oven Oven

controlled by even bake, fast recovery snap action modulating oven thermostat. Available with convection oven in lieu of standard oven or storage base in lieu of oven(s).

NOTE: Ranges supplied with casters must be installed with an approved restraining device.



G Series 48" Gas Restaurant Range

Garland Commercial Ranges Ltd.
 1177 Kamato Road,
 Mississauga, Ontario
 L4W 1X4 CANADA

General Inquires 1-905-624-0260
 USA Sales, Parts and Service 1-800-424-2411
 Canadian Sales 1-888-442-7526
 Canada or USA Parts/Service 1-800-427-6668

www.garland-group.com
 6949
 12/18





G Series 48" Gas Restaurant Range

Space saver oven model

6" POWER CORD (FOR OPTIONAL CONVECTION MOTOR) 3-1/2" [89mm] 2-1/4" [57mm] 34-1/2" [876mm] 27-1/4" [692mm] 5" [127mm]

47-1/4" [1200mm] 21" [534mm] 1-1/2" [39mm] 1" N.P.T. REAR GAS INLET 23 1/4" [590mm] 30" [763mm] 6" [152mm]

12-1/8" [307mm] 18-3/8" [466mm] 51" [1296mm] 39-3/8" [1000mm] LOW PROFILE BACKGUARD 3-7/8" [98mm] ADD FOR CONVECTION OVEN 31-1/8" [791mm] 13-7/8" [352mm] ADD WHEN DOOR OPEN 27-3/4" [704mm] STD OVEN 14-3/8" [365mm] 8-3/4" [222mm] OPTIONAL SHELF 18-1/4" [464mm]

Convection ovens with 120V, 60 Hz, 1 phase, 3.4 amps motors are supplied with 6'/1829mm cord and plug (NEMA 5-15P); 240V ,50/60 Hz, 1 phase motors are not supplied with cord and plug and must have direct connect.
Gas input ratings shown for installations up to 2000 ft.,(610m) above sea level. Please specify altitudes over 2000 ft.
This product is not approved for residential use.

Full size oven shown on left, standard on right

Model Number	Open Burners	Griddle	Oven(s)	Total BTU/Hr Natural	Ship Wt.		Model Number	Open Burners	Griddle	Oven(s)	Total BTU/Hr Natural	Ship Wt.	
					Lbs.	Kg						Lbs.	Kg
G48-8LL	8	—	(2) 20"	328,000	572	259	G48-4G24SS	4	24"	—	168,000	497	255
G48-8RS1	8	—	(1) 26"	302,000	539	264	G48-2G36LL	2	36"	(2) 20"	184,000	672	305
G48-8SS	8	—	—	264,000	402	182	G48-2G36RS1	2	36"	(1) 26"	158,000	639	290
G48-6G12LL	6	12"	(2) 20"	280,000	602	273	G48-2G36SS	2	36"	—	120,000	502	228
G48-6G12RS1	6	12"	(1) 26"	254,000	569	258	G48-G48LL	—	48"	(2) 20"	136,000	692	314
G48-6G12SS	6	12"	—	216,000	432	196	G48-G48RS1	—	48"	(1) 26"	110,000	659	299
G48-4G24LL	4	24"	(2) 20"	232,000	667	303	G48-4G55	—	48"	—	72,000	522	237
G48-4G24RS1	4	24"	(1) 26"	206,000	604	274							

¹ Available with convection oven change RS to CS
Shipping volume, all models= 65 Cu Ft

Width In (mm)	Depth ² In (mm)	Height w/shelf In (mm)	Oven Interior-in (mm)			Combustible Wall Clearance-in (mm)		Entry Clearance In (mm)		Manifold Operating Pressure	
			Height	Depth ³	Width ⁴	Sides	Rear	Crated	Uncrated	Natural	Propane
47-1/4 (1200)	34-1/2 (876)	57 (1448)	13 (330)	26 (660)	26-1/4 (667)	14 (356)	6 (152)	37 (940)	36-1/2 (927)	4.5" WC 11 mbar	10.0" WC 25 mbar

² Convection oven base models add 3 7/8" (98mm) to the depth of the unit. ³ Convection oven depth 22" (559mm)
⁴ Space-saver oven is 20" (508mm) wide. Note: Installation clearance reductions are applicable only where local codes permit.

Burner Ratings (BTU/Hr/kW)				
Gas Type	Open Top	Griddle/Hot Top	Standard Oven or Convection	Space Saver Oven
Natural	32,000/9.37	18,000/5.27	38,000/11.13	32,000/9.37
Propane	26,000/7.61	18,000/5.27	32,000/9.38	28,000/8.20

Welbilt reserves the right to make changes to the design or specifications without prior notice.

Garland Commercial Ranges Ltd.
1177 Kamato Road,
Mississauga, Ontario
L4W 1X4 CANADA

General Inquires 1-905-624-0260
USA Sales, Parts and Service 1-800-424-2411
Canadian Sales 1-888-442-7526
Canada or USA Parts/Service 1-800-427-6668

www.garland-group.com
6949
12/18





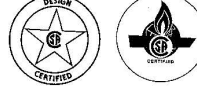

19	FRYER	CASTORS	FRYMASTER	GF40
----	-------	---------	-----------	------



Standard Gas Fryers

Project _____
 Item _____
 Quantity _____
 CSI Section 11400 _____
 Approval _____
 Date _____

Standard Gas Fryers

<p>Models</p> <p><input type="checkbox"/> GF14 <input type="checkbox"/> GF40</p>	
 <p>GF40 Shown with casters</p>	<p>Standard Features</p> <ul style="list-style-type: none"> • Open-pot design is easy to clean • Millivolt temperature controls, no electric connection required • Stainless steel frypot, door and cabinet • Durable temperature probe • Deep cold zone, 1-1/4" (3.2 cm) ball-type drain valve • Master Jet burner heat-transfer system • Two twin baskets • 6" steel legs with 1" adjustment and casters • 3/4" (1.91 cm) (NPT) gas connection <p>GF14</p> <ul style="list-style-type: none"> -- 40-lb. (20 liter*) oil capacity -- 100,000 Btu/hr. input (25,189 kcal/hr.) (29.3 kw/hr.) -- Frying area 12" x 15" x 4" (30.5 x 38.1 x 10.2 cm) <p>GF40</p> <ul style="list-style-type: none"> -- 50-lb. (25 liter*) oil capacity -- 122,000 Btu/hr. input (30,730 kcal/hr.) (35.8 kw/hr.) -- Frying area 14" x 15" x 5" (35.6 x 38.1 x 12.7 cm)
<p>Options & Accessories</p> <ul style="list-style-type: none"> <input type="checkbox"/> Frypot cover <input type="checkbox"/> Piezo ignitor kit <input type="checkbox"/> Full basket <input type="checkbox"/> Triplet basket <input type="checkbox"/> Crisper tray <input type="checkbox"/> Sediment tray <input type="checkbox"/> 3/4" x 36" quick disconnect with gas line <input type="checkbox"/> 3/4" x 48" quick disconnect with gas line <input type="checkbox"/> Top connecting strip <p>See Frymaster domestic price list for other available options and accessories.</p>	
<p>Specifications</p> <p>Designed for versatile frying production and solid performance</p> <p>These all-purpose fryers feature outstanding Frymaster reliability and durability. GF fryers are capable of cooking a wide variety of fried foods with consistent uniformity and great taste.</p> <p>The Master Jet burner system's durable metal targets create a large heat-transfer area for reliable, even heat distribution. Durable temperature probe senses temperature changes and activates burner response.</p> <p>The open frypot has a large heat-transfer area and every inch of the frypot and cold zone can be cleaned and wiped down by hand.</p> <p>The large cold zone and forward sloping bottom help collect and remove sediment from the frypot to safeguard oil quality and support routine frypot cleaning.</p> <p>*Liter conversions are for solid shortening @70°F.</p>	
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;">   </div> <div style="width: 45%;">  </div> </div>	

8700 Line Avenue
 Shreveport, LA 71106-6814
 USA

Tel: 318-865-1711
 Tel: 1-800-221-4583
 Fax: 318-868-5987
 E-mail: info@frymaster.com

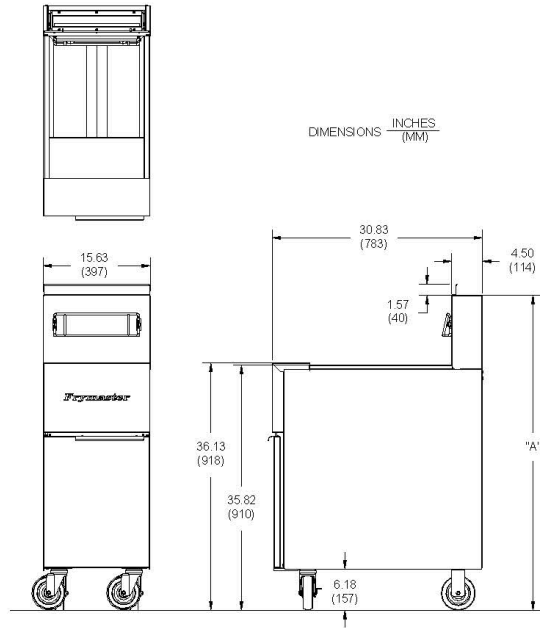
www.frymaster.com
 Bulletin No. 818-0592
 Revised 11/2/15





Standard Gas Fryers

Model #
CSI Section 11400



DIMENSIONS

MODEL NO.	OIL CAPACITY	DIMENSIONS (INCHES)			DRAIN HEIGHT with Drain Pipe	NET WEIGHT	SHIPPING INFORMATION					
		WIDTH	DEPTH	HEIGHT (A)			WEIGHT	CLASS	CU. FT.	DIMENSIONS (cm)		
GF14	40 lbs. (20 liters)	15-5/8" (39.7 cm)	30-7/8" (78.4 cm)	41-1/8" (104.4 cm)	13" (33.0 cm)	115 lbs. (52 kg)	152 lbs. (69 kg)	85	19	W 22" (55.9 cm)	D 36" (91.4 cm)	H 46-1/2" (118.1 cm)
GF40	50 lbs. (25 liters)	15-5/8" (39.7 cm)	30-7/8" (78.4 cm)	46-1/8" (117.2 cm)	13" (33.0 cm)	131 lbs. (59 kg)	176 lbs. (80 kg)	85	21	22" (55.9 cm)	36" (91.4 cm)	46-1/2" (118.1 cm)

POWER REQUIREMENTS

MODEL	NAT/LP GAS	ELECTRICAL
GF14	100,000 Btu/hr. (25,189 kcal) (29.3 kw)	none required for millivolt system
GF40	122,000 Btu/hr. (30,730 kcal) (35.8 kW)	

NOTES

- Check plumbing codes for proper supply line sizing. Recommended minimum store manifold pressure to be 6" W.C. for natural gas and 11" W.C. for LP gas. Check plumbing codes for proper supply line sizing to attain burner manifold pressure of 3-1/2" W.C. natural or 8-1/4" W.C. LP

CLEARANCE INFORMATION

A minimum of 24" (61.0 cm) should be provided at the front of the unit for servicing and proper operation, and 6" (15.2 cm) between the sides and rear of the fryer to any combustible material. A minimum of 18" (45.7 cm) should be maintained between the flue outlet and the lower edge of the exhaust hood filters.

HOW TO SPECIFY

The following descriptions will assist with ordering the features desired for this equipment:

- GF14 40-lb. standard, open-pot gas fryer with millivolt controls and durable temperature probe
- GF40 50-lb. standard, open-pot gas fryer with millivolt controls and durable temperature probe

8700 Line Avenue
 Shreveport, LA 71106-6800
 USA

Tel: 318-865-1711
 Tel: 1-800-221-4583
 Fax: 318-868-5987
 E-mail: info@frymaster.com

www.frymaster.com
 Bulletin No. 818-0592
 Revised 11/2/15
 Litho in U.S.A. ©Frymaster, LLC



We reserve the right to change specifications appearing in this bulletin without incurring any obligation for equipment previously or subsequently sold. Check www.frymaster.com for updates.

20	RANGE	6" LEGS	GARLAND	G48-8RS & G48-8LL
----	-------	---------	---------	-------------------



G Series 48" Gas Restaurant Range

Project _____
 Item _____
 Quantity _____
 CSI Section 11400
 Approved _____
 Date _____

Models

- G48-8RS • G48-6G12RS • G48-4G24RS • G48-2G36RS • G48-G48RS
- G48-8SS • G48-6G12SS • G48-4G24SS • G48-2G36SS • G48-G48SS
- G48-8LL • G48-6G12LL • G48-4G24LL • G48-2G36LL • G48-G48LL



Model G48-8LL

Standard Features

- Large 27" (686mm) work top surface
- Stainless steel front and sides
- Stainless steel 5" (127mm) plate rail
- Stainless steel backguard, w/removable stainless steel shelf
- 12" (305mm) section stamped drip trays w/ dimpled bottom
- 6" (152mm) adj. stainless steel legs
- Large easy-to-use control knobs
- Gas regulator

Standard on Applicable Models:

- Open storage base in lieu of oven.
- Ergonomic split cast iron top ring grates
- 33,000 Btuh/ 9.67 kW 2 piece cast iron Starfire- Pro open top burner
- 5/8" (15mm) thick steel griddle plate w/manual hi/lo valve control, 23" (584mm) working depth surface, Standard on right, optional on left
- 4-1/4" (108mm) wide grease trough
- 18,000 Btuh/5.27 kW cast iron "H" style griddle burner per 12"(305mm) width of griddle
- 32,000 Btuh/ 9.38 kW (space saver) or 38,000 Btuh/ 11.13 kW cast iron "H" style oven burner
- Snap action modulating oven thermostat low to 500° F
- Porcelain oven interior, std. oven fits sheet pans 18x26 in both directions

- Nickel plated oven rack and 3-position removable oven rack guide
- Strong, keep-cool oven door handle
- Convection oven w/3 nickel plated oven racks and removable rack guides in lieu of standard oven w/ 1/3HP 120v 60 Hz single phase fan motor; change Suffix RS to CS

Options & Accessories

- Convection oven motor 240v 50/60Hz single phase
- Snap action modulating griddle control 175° to 425° F
- Hot top 12" (305mm) plate in lieu of two open burners, manual valve controlled w/18,000 Btuh/5.27 kW cast iron "H" burner standard on left side
- Low profile 9-3/8" (238mm) backguard stainless steel front and sides
- Additional oven racks
- 6" (152mm) levelling swivel casters (4), w/front locking
- Flanged deck mount legs
- Celsius temperature dials
- Piezo spark ignition for pilots on griddles

Specifications

Gas restaurant series range with 2 space saver ovens, 20" (508mm) wide or large capacity oven 26-1/4" (667mm) wide, 47-1/4" wide, 27" (686mm) deep work top surfaces. Stainless steel front, sides and 5" wide front rail. 6" (152mm) legs with adjustable feet. Eight Starfire-Pro 2 piece, 33,000 Btuh/ 9.67 kW (natural gas), cast open burners set in split cast iron ergonomic grates. Griddle or optional hot top with cast iron "H" style burners, 18,000 Btuh/5.27 kW (natural gas), in lieu of open burners. One piece oven with porcelain interior and heavy duty, "keep cool" door handle. Heavy cast iron "H" oven burner rated 32,000 Btuh/ 9.38 kW (natural gas) for space saver oven, and 38,000 Btuh/11.13 kW (natural gas) for standard oven Oven

controlled by even bake, fast recovery snap action modulating oven thermostat. Available with convection oven in lieu of standard oven or storage base in lieu of oven(s).

NOTE: Ranges supplied with casters must be installed with an approved restraining device.



Garland Commercial Ranges Ltd.
 1177 Kamato Road,
 Mississauga, Ontario
 L4W 1X4 CANADA

General Inquires 1-905-624-0260
 USA Sales, Parts and Service 1-800-424-2411
 Canadian Sales 1-888-442-7526
 Canada or USA Parts/Service 1-800-427-6668

www.garland-group.com
 6949
 12/18



G Series 48" Gas Restaurant Range



G Series 48" Gas Restaurant Range

Space saver oven model

6" POWER CORD (FOR OPTIONAL CONVECTION MOTOR) 3-1/2" [89mm] 2-1/4" [57mm] 34-1/2" [876mm] 27-1/4" [692mm] 5" [127mm]

Convection ovens with 120V, 60 Hz, 1 phase, 3.4 amps motors are supplied with 6'/1829mm cord and plug (NEMA 5-15P); 240V, 50/60 Hz, 1 phase motors are not supplied with cord and plug and must have direct connect.
Gas input ratings shown for installations up to 2000 ft.,(610m) above sea level. Please specify altitudes over 2000 ft.
This product is not approved for residential use.

47-1/4" [1200mm] 1-1/2" [39mm] 21" [534mm] 1" N.P.T. REAR GAS INLET 231/4" [590mm] 30" [763mm] 6" [152mm] 12-1/8" [307mm] 18-3/8" [466mm] 51" [1296mm] STD BACKGUARD W/HIGH SHELF 39-3/8" [1000mm] LOW PROFILE BACKGUARD 27-3/4" [704mm] 14-3/8" [365mm] 8-3/4" [222mm] OPTIONAL SHELF 13-7/8" [352mm] ADD WHEN DOOR OPEN 31-1/8" [791mm] 3-7/8" [98mm] ADD FOR CONVECTION OVEN

Full size oven shown on left, standard on right

Model Number	Open Burners	Griddle	Oven(s)	Total BTU/Hr Natural	Ship Wt.		Model Number	Open Burners	Griddle	Oven(s)	Total BTU/Hr Natural	Ship Wt.	
					Lbs.	Kg						Lbs.	Kg
G48-8LL	8	—	(2) 20"	328,000	572	259	G48-4G24SS	4	24"	—	168,000	497	255
G48-8RS1	8	—	(1) 26"	302,000	539	264	G48-2G36LL	2	36"	(2) 20"	184,000	672	305
G48-8SS	8	—	—	264,000	402	182	G48-2G36RS1	2	36"	(1) 26"	158,000	639	290
G48-6G12LL	6	12"	(2) 20"	280,000	602	273	G48-2G36SS	2	36"	—	120,000	502	228
G48-6G12RS1	6	12"	(1) 26"	254,000	569	258	G48-G48LL	—	48"	(2) 20"	136,000	692	314
G48-6G12SS	6	12"	—	216,000	432	196	G48-G48RS1	—	48"	(1) 26"	110,000	659	299
G48-4G24LL	4	24"	(2) 20"	232,000	667	303	G48-4G55	—	48"	—	72,000	522	237
G48-4G24RS1	4	24"	(1) 26"	206,000	604	274							

¹ Available with convection oven change RS to CS
Shipping volume, all models= 65 Cu Ft

Width In (mm)	Depth ² In (mm)	Height w/shelf In (mm)	Oven Interior-in (mm)			Combustible Wall Clearance-in (mm)		Entry Clearance In (mm)		Manifold Operating Pressure	
			Height	Depth ³	Width ⁴	Sides	Rear	Crated	Uncrated	Natural	Propane
47-1/4 (1200)	34-1/2 (876)	57 (1448)	13 (330)	26 (660)	26-1/4 (667)	14 (356)	6 (152)	37 (940)	36-1/2 (927)	4.5" WC 11 mbar	10.0" WC 25 mbar

² Convection oven base models add 3 7/8" (98mm) to the depth of the unit. ³ Convection oven depth 22" (559mm)
⁴ Space-saver oven is 20" (508mm) wide. Note: Installation clearance reductions are applicable only where local codes permit.

Burner Ratings (BTU/Hr/kW)				
Gas Type	Open Top	Griddle/Hot Top	Standard Oven or Convection	Space Saver Oven
Natural	32,000/9.37	18,000/5.27	38,000/11.13	32,000/9.37
Propane	26,000/7.61	18,000/5.27	32,000/9.38	28,000/8.20

Welbilt reserves the right to make changes to the design or specifications without prior notice.

Garland Commercial Ranges Ltd.
1177 Kamato Road,
Mississauga, Ontario
L4W 1X4 CANADA

General Inquires 1-905-624-0260
USA Sales, Parts and Service 1-800-424-2411
Canadian Sales 1-888-442-7526
Canada or USA Parts/Service 1-800-427-6668

www.garland-group.com
6949
12/18



21	DISHWASHER	6" LEGS	NOBLE	HT-180
----	------------	---------	-------	--------



Project _____
 Item _____
 Quantity _____
 CSI Section 11400
 Approval _____
 Date _____

NOBLE HT-180

NOBLE HT-180



Standard Features

- Sani-Sure™ feature ensures proper rinse water temperature
- Multi-cycle timer (Extra Heavy, Heavy, Medium, Normal)
- Specially designed stainless steel nozzles provide superior cleaning action
- 17-1/4" (438 mm) door opening accepts 18" (457 mm) trays
- Interchangeable wash/rinse arms screw out for simple cleanup
- Auto-fill/auto-start
- Door switch
- Delime/manual wash switch
- Vent fan control
- Low watt density electric wash tank heater
- Hi-limit thermostat and low water protection
- Top mounted controls for ease of operation
- Adjustable bullet feet
- Uses standard 20" X 20" (508 mm X 508 mm) racks
- Front dress panel
- Detergent/rinse additive signal connection fuse box
- Self-draining stainless steel pump
- Built-in 70° F (38.9° C) rise booster heater is standard
- Large scrap basket

Mandatory Specs

Specify voltage _____

Options

- 480V Electrical
- Single Phase
- Drain Quench System
- Scaltrol
- Water Hammer Arrestor
- Pressure Regulator
- Flanged Feet
- False Panel
- Door Interlock

Accessories

- 36-Compartment Rack
 - 4-1/8" tall (105 mm)
 - 5-5/8" tall (143 mm)
 - 7" tall (178 mm)
- Combination Rack
- Peg Rack

Specifications

Uses 0.89 gallons (3 liters) of water per rack
 Total automatic (normal) cycle - 57 seconds
 58 racks per hour (normal) cycle
 1 HP Wash Pump Motor
 Single point connections for all utilities

Field convertible from straight through to corner and vice versa

Field convertible from 3-phase to single-phase and vice versa

Durable stainless steel construction



Intertek



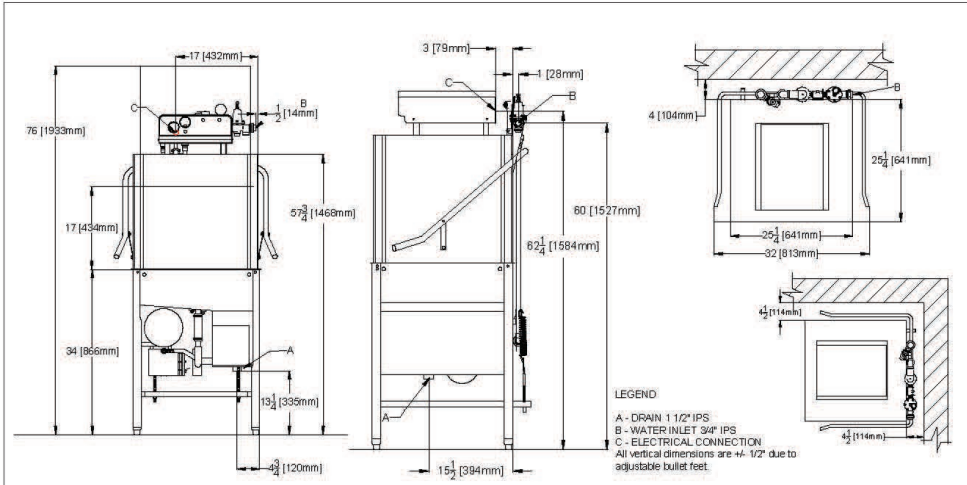
Intertek



We reserve the right to change specifications in this bulletin without incurring any obligation for equipment previously or subsequently sold.



NOBLE HT-180



MODEL NO.	MACHINE DIMENSIONS			DRAIN HEIGHT	SHIPPING INFORMATION					
	HEIGHT	WIDTH	DEPTH		WEIGHT	CLASS	CUBE	HEIGHT	WIDTH	DEPTH
NOBLE HT-180	64-3/8" (1635 mm)	25-1/4" (641 mm)	25-1/4" (641 mm)	13-1/4" (335 mm)	263 lbs (120 kg)	200	58.15 cu. ft.	72.5" (1842 mm)	33" (839 mm)	42" (1067 mm)

DIMENSION REQUIREMENTS			
Wall Clearance (minimum)	4" (102 mm)		
Standard Table Height	34" (864 mm)		
Inside Clearance	17-1/4" (438 mm)		
Machine Height with Door Open	76" (1933 mm)		

WATER REQUIREMENTS	
Inlet Temperature	70°F (38.9°C) Rise
	110°F (43°C)
Gallons per Hour	52 gal (197 L)
Gallons per Rack	.89 gal (3 L)
Waterline Size IPS (minimum)	1/2"
Drainline Size IPS (minimum)	1- 1/2"
Flow Pressure (PSI)	10
Wash Tank Capacity	8 gal (30 L)
Booster Tank Capacity	3 gal (11 L)

OPERATING CAPACITY				
Racks per Hour	Normal 58	Medium 30	Heavy 20	Extra Heavy 12
OPERATING CYCLE (seconds)	Wash	Rinse	Dwell	Total Cycle
Normal	40	13	4	57
Medium	100	13	4	117
Heavy	160	13	4	177
Extra Heavy	280	13	4	297

OPERATING TEMPERATURES	
Wash (minimum)	150° F (66° C)
Rinse (minimum)	180° F (82° C)

WASH PUMP MOTOR		
Wash Pump Motor Horsepower	1 HP	
	Volts	KW
Electric Wash Tank Heater	208V	4.1
	230V	5.0
	460V	5.0
Electric Rinse Tank Heater - 70° F (38.9°C) Rise	208V	10.5
	230V	12.9
	460V	12.9

APPROXIMATE LOAD AMPS	
Power Supply	AMPS
208V/60HZ/1PH	75.8
208V/60HZ/3PH	46.3
230V/60HZ/1PH	83.6
230V/60HZ/3PH	50.7
460V/60HZ/3PH	24.1

HOW TO SPECIFY: NOBLE HT-180

www.nobleproducts.biz

NO-0007 [10/03/17]

We reserve the right to change specifications in this bulletin without incurring any obligation for equipment previously or subsequently sold.

22	CLEAN DISHTABLE	6" LEGS	ELKAY	CDT84
----	-----------------	---------	-------	-------



SPECIFICATION SHEET

Elkay SSP - Dish Tables - Clean Standard Series - Straight Design - Right

Item No.:	_____	Qty.:	_____
Model No.:	_____		
Project No.:	_____		



Standard Series Clean Dish Table

Standard Series Left-to-Right Straight Clean Dish Table

- | | |
|------------------------------------|------------------------------------|
| <input type="checkbox"/> CDT-24-RX | <input type="checkbox"/> CDT-72-RX |
| <input type="checkbox"/> CDT-36-RX | <input type="checkbox"/> CDT-84-RX |
| <input type="checkbox"/> CDT-48-RX | <input type="checkbox"/> CDT-96-RX |
| <input type="checkbox"/> CDT-60-RX | |

Options

- Stainless Steel H-frame Legs and Feet
- Rack Slides
- Scrap Baskets with Rack Slides
- Undershelves

* For additional available options, contact Elkay SSP

Specifications

Standard Clean Dish Table, straight design, left-to-right operation, 10" high backsplash with 2" return, 16 gauge stainless steel top, galvanized legs with adjustable plastic feet, NSF approved

Features

- 16 Ga. stainless steel
- Welded construction for consistent metal gauge thickness throughout
- 10" (254 mm) backsplash with tile edge for easy installation
- Raised 1-1/2" (38.1 mm) diameter rolled edge
- 1-5/8" (41.3 mm) galvanized H-Frame legs with 1" (25.4 mm) adjustable plastic feet

Materials

- Top: Bowl and backsplash are 16 gauge 300 series stainless steel
- Legs: 1-5/8" (41.3 mm) diameter heavy gauge galvanized tubing with galvanized leg gussets and high impact, corrosion resistant, adjustable 1" (25.4 mm) feet

Flyer Product

In keeping with our policy of continuing product improvement, Elkay SSP reserves the right to change product specifications without notice.

Elkay SSP
 421 N. Freya St.
 Spokane, WA 99205
 Phone: 800-726-0553 Fax: 509-535-1493

DT-CDTRX06JULY2011



AUTOQUOTES



This specification describes an Elkay SSP product with design, quality and functional benefits to the user. When making a comparison of other producers' offerings, be certain these features are not overlooked.

Website: www.sspinc.net
 Email: sspsales@elkay.com
 ©2011 Elkay

Page 1 of 3

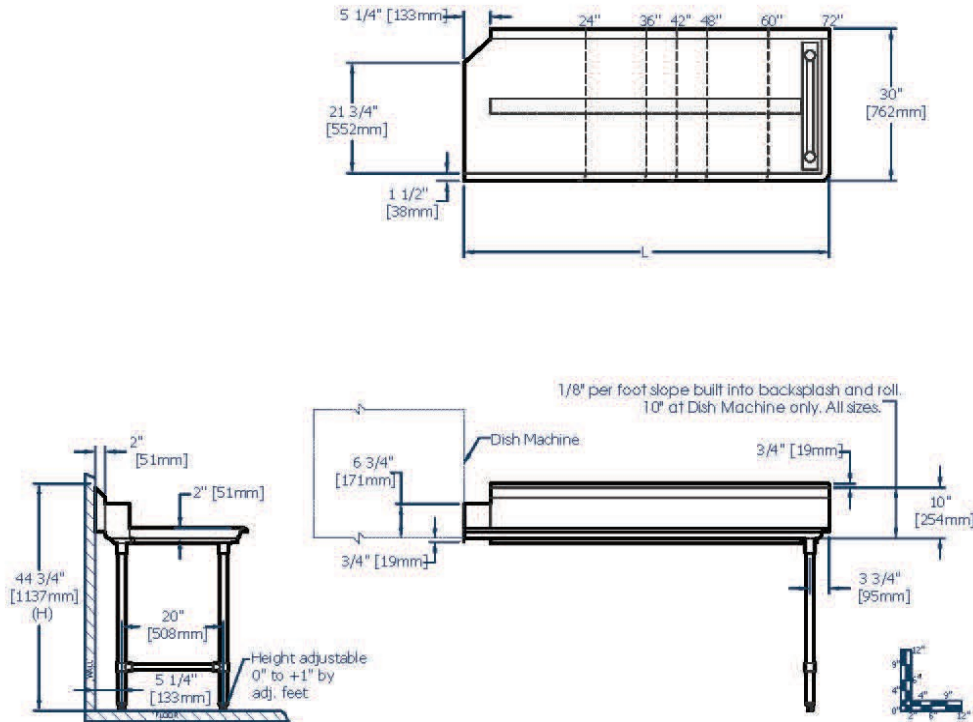
Elkay SSP – Dish Tables – Clean Standard Series – Straight Design – Right



Item No.:	_____	Qty.:	_____
Model No.:	_____		
Project No.:	_____		

Standard Series Clean Dish Table
 Standard Series Left-to-Right Straight Clean Dish Table

CDT
 24" - 72"



Model Number	Overall Size						Weight	
	Length L		Width W		Height H		lbs.	kg
	in.	mm	in.	mm	in.	mm		
CDT - 24 - R X	24	609.6	30	762	44.75	1137	61	28
CDT - 36 - R X	36	914.4	30	762	44.75	1137	80	36
CDT - 48 - R X	48	1219	30	762	44.75	1137	96	44
CDT - 60 - R X	60	1524	30	762	44.75	1137	117	53
CDT - 72 - R X	72	1829	30	762	44.75	1137	133	61
CDT - 84 - R X	84	2134	30	762	44.75	1137	169	77
CDT - 96 - R X	96	2438	30	762	44.75	1137	186	84

_____ Flyer Product
 _____ Product Positioned Right of Dish Machine
 _____ Length - in
 _____ Clean Dish Table, Straight Design

Elkay SSP
 421 N. Freya St.
 Spokane, WA 99205
 Phone: 800-726-0553 Fax: 509-535-1493

Website: www.sspinc.net
 Email: sspsales@elkay.com
 ©2011 Elkay

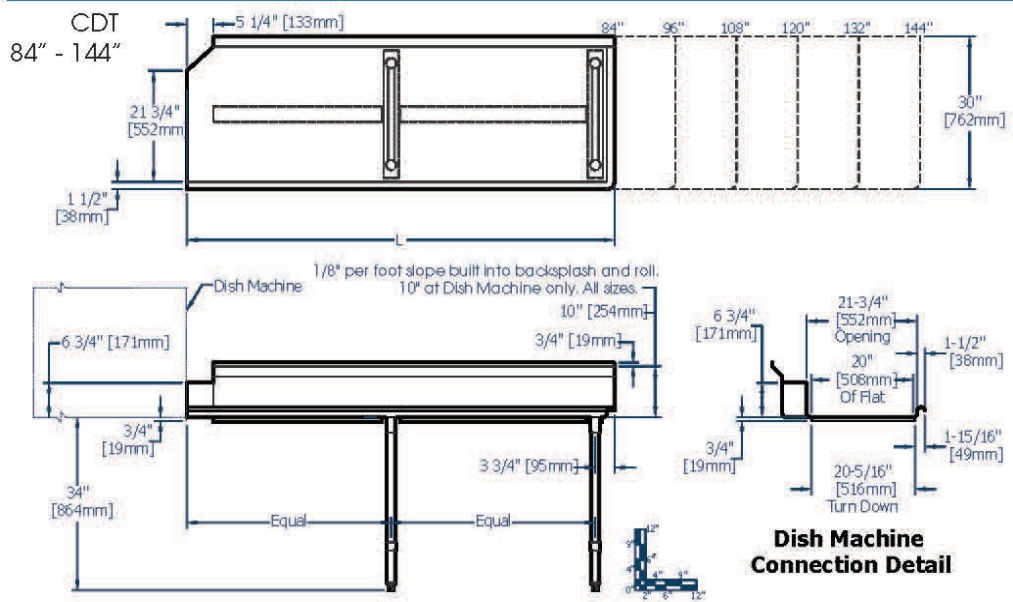
DT-CDTRX06JULY2011

Page 2 of 3



Item No.:	_____	Qty.:	_____
Model No.:	_____		
Project No.:	_____		

Elkay SSP - Dish Tables - Clean Standard Series - Straight Design - Right



Elkay SSP
 421 N. Freya St.
 Spokane, WA 99205
 Phone: 800-726-0553 Fax: 509-535-1493
 DT-CDTRX06JULY2011

Website: www.sspinc.net
 Email: sspsales@elkay.com
 ©2011 Elkay

23	REACH IN FRIDGE	CASTORS	CONTINENTAL	2RS
----	-----------------	---------	-------------	-----

REACH-IN REFRIGERATOR

Model: 2RS

2-Section Reach-In Refrigerator Shallow Depth

2RS - Stainless steel front, aluminum end panels and interior
2RS-SA - Stainless steel exterior, aluminum interior
2RS-SS - Stainless steel exterior and interior
 Designed to maintain **NSF-7** temperatures in **100°F** ambient.



Options and Accessories

(upcharge and lead times may apply)

Stainless steel case back	Half doors
Additional epoxy-coated steel shelves	Pass-Thru
Chrome or stainless steel shelves	Standard depth
Heavy-duty pilaster strips	Hinged glass doors
Rehinging of doors (consult factory)	Increased refrigeration systems
Expansion valve system	Special electrical req. (consult factory)
Wine display	Correctional Facility Options
Adjustable legs	• One way security screws
Digital thermometer	• Locking hasp (lock not included)
Remote models	• Stainless steel mesh cover
Custom laminates	• Coverless hinges

Consult factory for other model configurations, options and accessories.



Toll-Free: 800-523-7138
 Phone: 215-244-1400
 Fax: 215-244-9579

539 Dunksferry Road
 Bensalem, PA 19020
www.continentalrefrigerator.com

Project Name:

Model Specified:

Location:

Item No:

Quantity:

AIA #:

SIS #:

Standard Model Features

REFRIGERATION SYSTEM

Environmentally-safe R-134a refrigerant
 Self contained, performance-rated refrigeration system
 Automatic, electric condensate evaporator

CABINET ARCHITECTURE

3" non-CFC polyurethane foam insulation
 Smooth, polished chrome workflow door handles
 Cam action, lift off hinges
 Self-closing doors
 Magnetic snap-in door gaskets
 Cylinder lock in door
 Heavy-duty, epoxy-coated steel shelves
 5" casters

MODEL FEATURES

LED interior lighting
 External dial thermometer
 Energy saving switch for door heaters

APPROVAL:

Model Specifications

DIMENSIONAL DATA

Net Capacity (cu. ft.)	32 (906 cu l)
Width, Overall (in.)	52 (1321 mm)
Depth, Overall (in.) (incl. handles)	29 1/4 (743 mm)
Depth [less door] (in.)	25 7/8 (657 mm)
Depth [door open 90°] (in.)	49 1/2 (1257 mm)
Clear Door Width (in.)	19 3/8 (492 mm)
Clear Door Height (in.)	58 5/8 (1489 mm)
Height, Overall (in.) (incl. 5" casters)	82 1/4 (2089 mm)
No. of Door(s)	2
No. of Shelves	6
Shelf Area (sq. ft.)	40.8 (3.8 sq m)

REFRIGERANT DATA

Condensing Unit Size (H.P.)	1/3
Capacity (BTU/Hr)*	2560

ELECTRICAL DATA

Voltage (int'l)	115/60/1 (220/50/1)
Feed Wires (incl. ground)	3
Total Amps (int'l)	6.5 (4.9)
10 ft. Cord/Plug [attached] (int'l)	Yes (No)

SHIPPING DATA

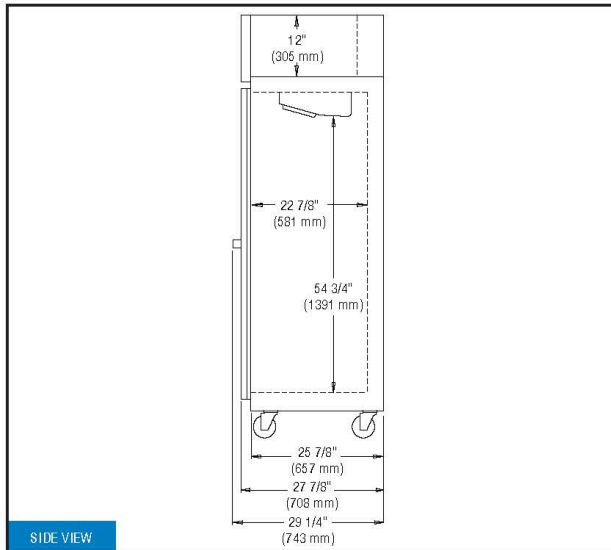
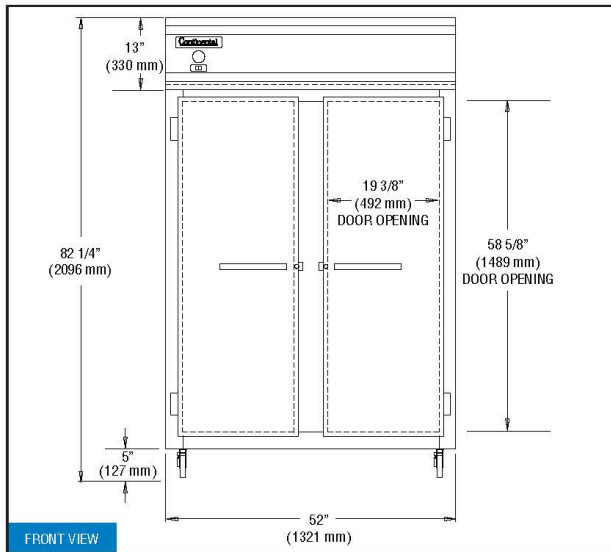
Height - Crated (in.)	85 1/2 (2172 mm)
Width - Crated (in.)	64 (1626 mm)
Depth - Crated (in.)	42 (1067 mm)
Volume - Crated (cu. ft.)	133 (3766 cu l)
Weight Std - Crated (lbs.)	520 (236 kg)
Weight SS - Crated (lbs.)	600 (272 kg)
Weight Std - Uncrated (lbs.)	350 (159 kg)
Weight SS - Uncrated (lbs.)	430 (195 kg)

* Rating @ +25°F evaporator, 90°F ambient
 Figures in parentheses reflect metric equivalents rounded to the nearest whole unit.



Equipped with one NEMA-5-15P Plug
 (varies by country)

Model Plan Views



IMPORTANT NOTE: If the cabinet is located directly against a wall and/or under a low ceiling, a minimum clearance of 12" is required.

Continental Refrigerator
 533 Dunksferry Road
 Bensalem, PA 19020
 www.continentalrefrigerator.com
 Toll-Free: 800-523-7138
 Phone: 215-244-1400
 Fax: 215-244-5679

Due to our continued efforts in developing innovative products, specifications subject to change without notice.



© Copyright 2015, Continental Refrigerator.
 A Division of National Refrigeration & Air Conditioning Products, Inc.

2RS (6/26/15)

24	TRAY SHELVES	MOUNTED	ADVANCED TABCO	TTR-2 & TTR-6
----	--------------	---------	----------------	---------------



STAINLESS STEEL
10" WIDE FOOD TABLE TUBULAR TRAY SHELVES
 Stationary & Drop-Down



Item #: _____ Qty #: _____
 Model #: _____
 Project #: _____

FEATURES:

Mounts to hot and cold food tables.
 Tubular tray design.
Stationary Tray Shelves include fixed brackets.
Drop-down Tray Shelves include drop-down brackets.

MATERIALS:

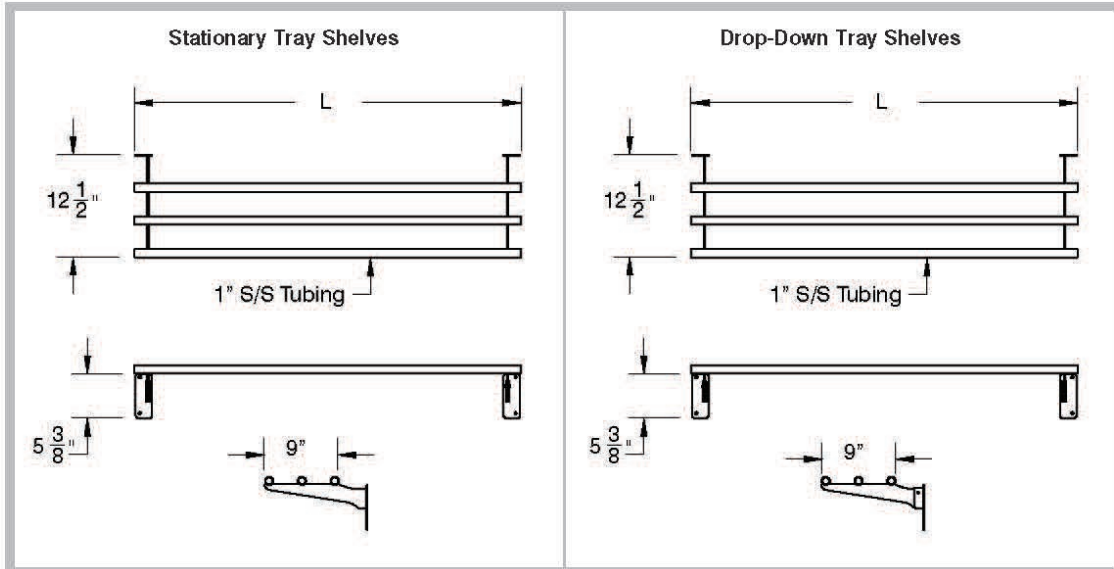
Shelf: 1" Stainless steel tubing
Brackets: 10 gauge stainless steel

Length (L)	STATIONARY		DROP-DOWN		Cubic Feet
	MODEL	Weight	MODEL	Weight	
31-13/16"	TTR-2	8 lbs.	TTR-2D	9 lbs.	1
47-1/8"	TTR-3	10 lbs.	TTR-3D	11 lbs.	1
62-3/8"	TTR-4	13 lbs.	TTR-4D	14 lbs.	2
77-3/4"	TTR-5	17 lbs.	TTR-5D	18 lbs.	2
93-1/8"	TTR-6	22 lbs.	TTR-6D	23 lbs.	2

DETAILS and SPECIFICATIONS

TOL Overall: ± .500" Interior: ± .250"

ALL DIMENSIONS ARE TYPICAL



 www.advancetabco.com	Customer Service Available To Assist You 1-800-645-3166 8:30 am - 8:00 pm E.S.T.	
	For Orders & Customer Service: Email: customer@advancetabco.com or Fax: 631-242-6900	For Smart Fabrication™ Quotes: Email: smartfab@advancetabco.com or Fax: 631-586-2933

ADVANCE TABCO is constantly engaged in a program of improving our products. Therefore, we reserve the right to change specifications without prior notice. © ADVANCE TABCO, JANUARY 2018 REF-V

Project: 855 East Laurel Drive Emergency Shelter
 Project No. 8875
 Bid No. 10736

25	SNEEZEGUARD	COUNTER MOUNTED	ADM	EP21
----	-------------	-----------------	-----	------



EP21

Specifications:

Construction:

- 1" Round tubing
- 2" Base flange
- Brackets accept 1/4" through 3/8" thick material

Available Finishes:

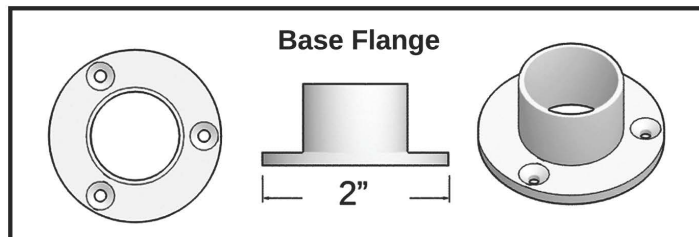
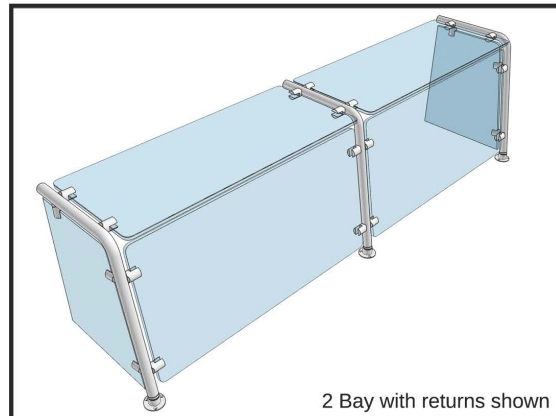
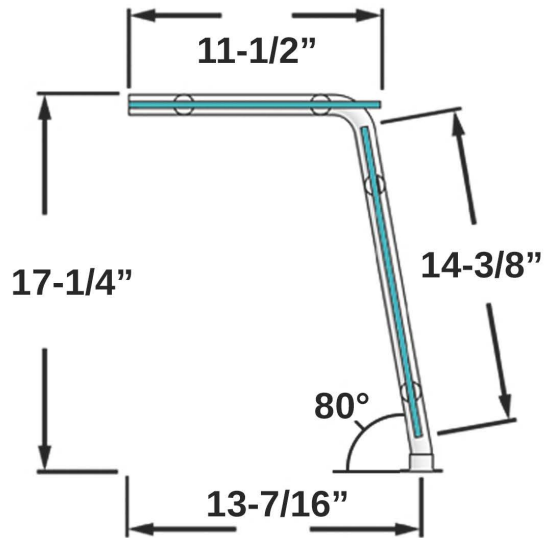
- Brushed stainless steel
- Brushed aluminum
- Powder-Coated: Satin Black

Glass:

- 1/4" Clear tempered glass with polished edges

Options:

- Glass corners:
 - Rounded
 - Squared
- End panels
- LED lighting
- Flange canopy covers
- Pivoting "Adjustable" face panels



Web-Site:
www.sneezeguard.com

E-Mail:
info@sneezeguard.com

Phone:
 (800) 805-1114

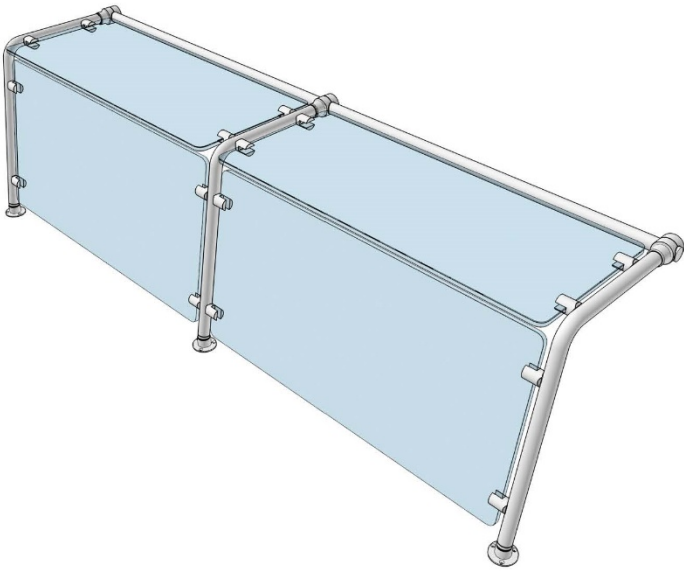
Fax:
 (800) 621-1992

Reference sheet: EP21
Dated: Oct 2014

QDM
" THE **SNEEZEGUARD**
COMPANY "

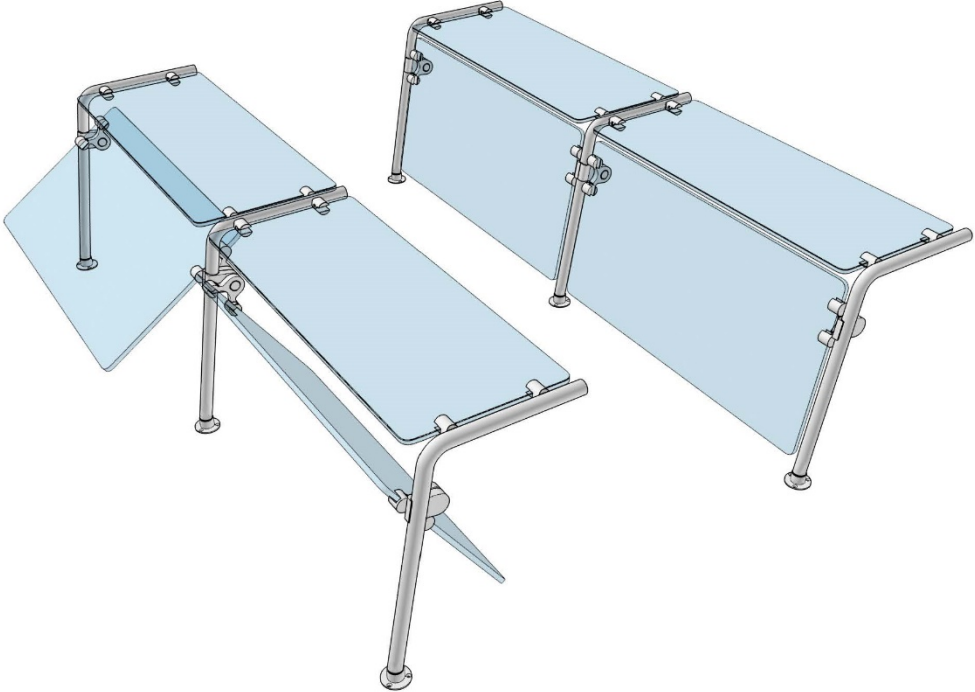
EP21

LED Lightbar



Patent Pending

Face "Adjustable" Panels



Patent Pending

Project: 855 East Laurel Drive Emergency Shelter
 Project No. 8875
 Bid No. 10736

26	WALK IN FREEZER/FRIDGE	ON SLAB	NORLAKE
----	------------------------	---------	---------



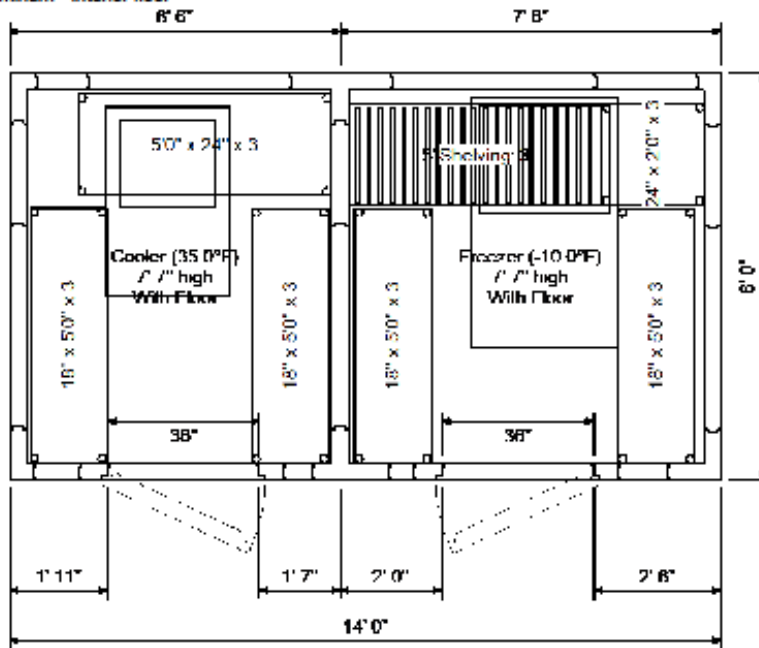
Quotation
 Quote No. NL1983918BE-B
 Date: 04/10/2019
 Page: 2 of 5

Customer	Weston Miles Arch
38835	For Quotation Purposes Only
	17500 Depot Street #120
	Morgan Hill, CA 95037
Attention	Sharon Morris
Project	Salinas Homeless Shelter
Item Number	
Rep Name	17 - Northern CA & Nevada
Rep Number	17
Sales Specialist	Beth Enloe


Prepared by: _____

California State Contractor License #940932.
 (1) Nor-Lake FINELINE Walk-In Cooler/Freezer Combination (2 compartments)
 14' 0" long, 8' 0" wide, 7' 7" high.

Finishes:
 26 Gauge Corrosion Resistant Stucco Embossed Coated Steel - Interior wall, Exterior wall, Interior ceiling
 26 Gauge Smooth Galvanized - Ceiling topside, Floor bottomside
 .100 Smooth Aluminum - Interior floor



27	AIR CURTAIN	WALL MOUNTED	MARS AIR DOORS	LPV242-1U
----	-------------	--------------	----------------	-----------



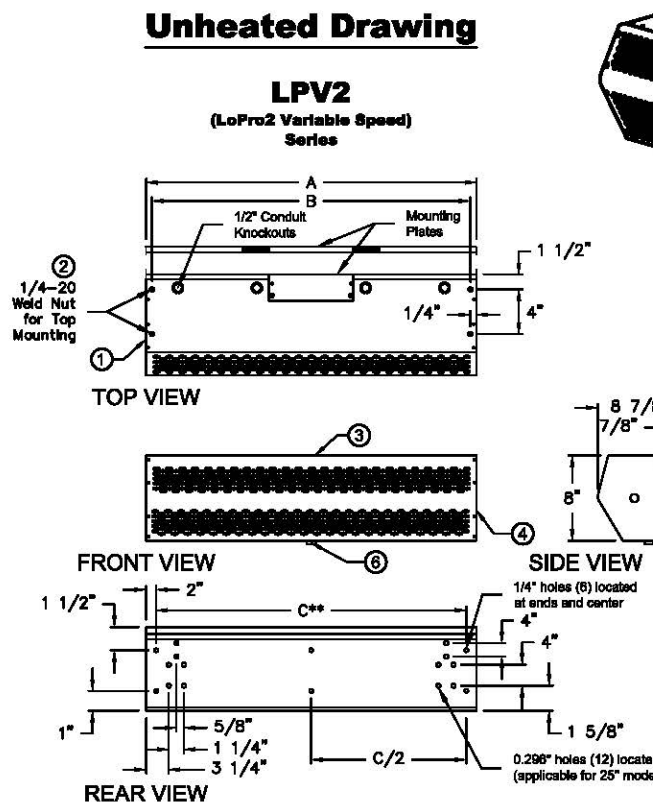
14716 S. Broadway • Gardena, CA 90248 • USA
TEL: (310) 532-1666 • (800) 421-1266 • FAX: (310) 324-3030
Web Site: www.marsair.com • E-mail: info@marsair.com

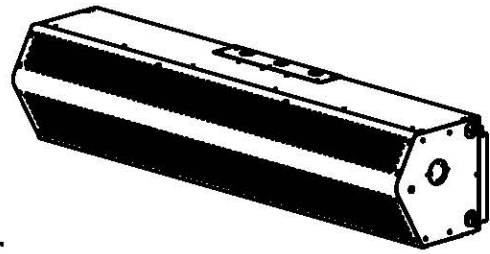
PROJECT		OPTIONS/ITEMS	
TITLE			
COMMENTS		DATE	PAGE
		8/3/16	
		REV. NO	
MODEL NO.	LP2 Series	DRAWING NO	LPV2U-F
DRAWN BY	BH	CHECKED BY	
		FILE NAME	


Unheated Drawing

LPV2


(LoPro2 Variable Speed) Series








⑧ Recommended Accessories



Door Limit Switches
(Mechanical plunger/roller style shown)



Brackets
(Offset mounting style shown)

Notes:

- This product is designed to meet the National Electric Code (NEC) and ETL Listed (UL 507 and CSA 22.2).
- 1/4" mounting holes provided for wall mounting (4) and overhead mounting (4), (2) on each end. Additional 0.296" mounting holes (12) provided.
- All units have a self contained one piece cabinet up to 72", fire retardant and corrosion proof paint lock metal double, protected with baked on Obsidian Black color, rust preventative electrostatic polyurethane powder coating.
- Cabinet has sufficient strength for fastening to wall on both ends without intermediate support. Units greater than 72" are double units joined with a 2" mounting bracket located in the center and must be center supported, field installed.
- Unit is to be installed such that air flow is unobstructed. Air discharge nozzle containing an adjustable air directional vane with 40° sweep front to back.
- Mounted adjustable speed controller knob allows air velocity to meet a wide range of field conditions. Units greater than 72", the speed controller will be located on the right hand unit and controls both units, field wired.
- Circuit protection as per NEC by others.
- Optional door limit switch and mounting brackets are field installed and/or wired by others. The door limit switch is to be mounted such that the air curtain turns on as door begins to open. To prevent unit damage, the mounting brackets must be installed such that the bottom of the air curtain is not below the door header.

MODEL NUMBER	OVERALL LENGTH A (In)	MOUNTING LENGTH B (In)	REAR MOUNTING CENTER C (In)
LPV225-1U ^a -OB	25	24 1/2	21
LPV236-1U ^a -OB	36	35 1/2	32
LPV242-1U ^a -OB	42	41 1/2	38
LPV248-1U ^a -OB	48	47 1/2	44
LPV260-1U ^a -OB	60	59 1/2	56
LPV272-1U ^a -OB	72	71 1/2	68
LPV284-2U ^a -OB	86	85 1/2	N/A
LPV296-2U ^a -OB	96	97 1/2	N/A
LPV2108-2U ^a -OB	110	108 1/2	N/A
LPV2120-2U ^a -OB	122	121 1/2	N/A
LPV2144-2U ^a -OB	146	145 1/2	N/A



atmosphere is everything

14716 S. BROADWAY, GARDENA, CA 90248 • Ph: (310)532-1555 Fax: (310)532-3030 • www.marsair.com
 © Copyright Mars Air Systems, LLC 2014

LPV2 (LoPro2 Variable Speed) Series

Unheated

Model Lengths 25" – 144"

Unheated Data Sheet

Applications: Environmental Separation (up to 8') and Insect Control (up to 7')

LPV2 (Low Profile Variable 2) Series 2	Mechanical Data						Lab Data	
	Model Number	Nozzle Length (in)	Length (in)	Depth (in)	Height (in)	Motor (hp)	Weight (lbs)	Max Velocity (fpm)
LPV225-1U*-OB	25	25	9	8	1/6	20	1800	625
LPV236-1U*-OB	36	36	9	8	1/6	32	1800	900
LPV242-1U*-OB	42	42	9	8	1/6	35	1800	1050
LPV248-1U*-OB	48	48	9	8	1/6	40	1800	1200
LPV260-1U*-OB	60	60	9	8	1/6	48	1800	1500
LPV272-1U*-OB	72	72	9	8	1/6	58	1800	1800
LPV284-2U*-OB	86	86	9	8	Two 1/6	75	1800	2100
LPV296-2U*-OB	98	98	9	8	Two 1/6	83	1800	2400
LPV2108-2U*-OB	110	110	9	8	Two 1/6	92	1800	2700
LPV2120-2U*-OB	122	122	9	8	Two 1/6	102	1800	3000
LPV2144-2U*-OB	146	146	9	8	Two 1/6	122	1800	3600

* - Use corresponding letters in "Electrical Data" columns to complete the model numbers

Note: Data above is for 60 Hz, 17% reduction in the performance data with 50 Hz.

Features:

- ❖ 1/6 HP continuous duty motors
- ❖ Sleek self-contained one piece light gauge corrosion resistant paint lock metal design
- ❖ ETL Certified to conform to UL 507 (US) and CSA 22.2 (Canada) Standards
- ❖ Dynamically balanced corrosion resistant aluminum crossflow wheels
- ❖ Very low profile design, 8" (H) x 8 7/8" (D)
- ❖ Variable speed controller
- ❖ Wall mounting bracket removable for easy installation
- ❖ 1/4" mounting holes provided for wall mounting (4) and overhead mounting (4), 2 on each end
- ❖ Cabinet has sufficient strength for fastening to wall on both ends without intermediate support up to 72". (Models 84" to 144" require intermediate support in the center.)
- ❖ Adjustable air directional vane with 40° sweep front to back
- ❖ Standard color is Obsidian Black
- ❖ Rust preventative electrostatic polyurethane powder coating
- ❖ 5 year parts warranty
- ❖ Freight Included (FOB Continental USA)
- ❖ Proudly Made in the USA

Options and Accessories: (see Accessories Brochure)

- ❖ Door Limit Switches
- ❖ Wall and Overhead Bracket
- ❖ Custom colors and finishes (304SS, 316SS)

Sound Levels: (measured at 10' in an open field)

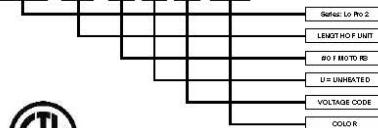
(25" & 36") - 49 dBA, (42") - 50 dBA, (48") - 52 dBA, (60"-96") - 53 dBA & (108"-144") - 54dBA

Electrical Data (FLA)	Unit Voltage (Voltage Code)	
	115v/1Ø (A)	208/230v/1Ø (D)
LPV225-1U*-OB	2.4	1.2
LPV236-1U*-OB	2.4	1.2
LPV242-1U*-OB	2.4	1.2
LPV248-1U*-OB	2.4	1.2
LPV260-1U*-OB	2.6	1.4
LPV272-1U*-OB	2.6	1.4
LPV284-2U*-OB	4.8	2.4
LPV296-2U*-OB	4.8	2.4
LPV2108-2U*-OB	5.0	2.6
LPV2120-2U*-OB	5.2	2.8
LPV2144-2U*-OB	5.2	2.8

* - Use corresponding letters in "Electrical Data" columns to complete the model numbers.

Note: For Ampacity Multiply FLA X 1.25

LPV2 72 - 1 U D - OB



Intertek

NOTE: MARS AIR SYSTEMS, LLC reserves the right to change specifications and product design without notice. Such revisions do not entitle the buyer to corresponding changes, improvements, additions or replacements for previously purchased equipment.

MARS AIR SYSTEMS, LLC • GARDENA, CA • USA

END OF SECTION

SECTION 101100 – VISUAL DISPLAY SURFACES

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
 - 1. Markerboards.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 055000 - Metal Fabrications: Provision of backing plates.
- C. Section 092900 - Gypsum Board: Provision of gypsum board surfaces.

1.3 REFERENCES

- A. AAMA - American Architectural Manufacturers Association
 - 1. 603.8 - Voluntary Performance Requirements and Test procedures for Pigmented Organic Coatings on Extruded Aluminum.
- B. APA - American Plywood Association
- C. NAAMM - National Association Architectural Metal Manufacturers
 - 1. MFM - Metal Finishes Manual.

1.4 SUBMITTALS

- A. Product Data: Provide manufacturer's product data for markerboards and tackboards.
- B. Shop Drawings: Provide shop drawings for each type of markerboard and tackboard required. Include sections of typical trim members and dimensioned elevations. Show anchors, grounds, reinforcement, accessories, layout, and installation details.

- C. Samples: Provide the following samples of each product for initial selection of colors, patterns, and textures, as required, and for verification of compliance with requirements indicated.
 - 1. Porcelain Enamel Markerboard: Manufacturer's color charts consisting of actual sections of porcelain enamel finish showing the full range of colors available for each type of markerboard required.
 - 2. Tackboard: Manufacturer's standard color samples.
 - 3. Aluminum Trim and Accessories: Samples of each finish type and color, on 6 inch long sections of extrusions and not less than 4 inch squares of sheet or plate, showing the full range of colors available.
- D. Manufacturer's Installation Data: Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.5 QUALITY ASSURANCE

- A. Design Requirements: The Drawings indicate size, profiles, and dimensional requirements of visual display boards and are based on the specific type and model indicated. Other visual display boards having equal performance characteristics by other manufacturers may be considered provided that deviations in dimensions and profiles are minor and do not change the design concept or intended performance as judged by the Architect.

1.6 PROJECT CONDITIONS

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delay.
 - 1. Allow for trimming and fitting wherever taking field measurements before fabrication might delay the Work.

1.7 WARRANTY

- A. Porcelain Enamel Markerboard Warranty: Furnish the manufacturer's written warranty, agreeing to replace porcelain enamel markerboards that do not retain their original writing and erasing qualities, become slick and shiny, or exhibit crazing, cracking, or flaking, provided the manufacturer's instructions with regard to handling, installation, protection, and maintenance have been followed.
 - 1. Warranty Period: 10 years.

2.0 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Markerboards: Polyvision, "Edge Series", or equal.

2.2 MATERIALS

A. Porcelain Enamel Markerboards: Provide balanced, high pressure laminated porcelain enamel markerboards of 3 ply construction consisting of face sheet, core material and backing.

1. Surface: Provide face sheet of magnetic, 24 gauge vitracite face over backing. Coat the exposed face and exposed edges with a 3 coat process consisting of primer, ground coat, and color cover coat, and the concealed face with a 2 coat process consisting of primer and ground coat. Fuse cover and ground coats to steel at the manufacturer's standard firing temperatures, but not less than 1,200 degrees Fahrenheit,
 - a. Color: As selected by the Architect.
2. Chalktray: Continuous, solid extrusion-type aluminum chalktray with ribbed section and smoothly curved exposed ends, profile as standard with reviewed manufacturer.
3. Backing: 1/4-inch thick interior type standard underlayment bearing trademark of APA or high quality hardboard as standard with reviewed manufacturer.
4. Sealer
 - a. Clear lacquer sanding sealer.
 - b. Manufacturer: Fuller-O'Brien 221-01; Glidden 6057; Sinclair 2600; or equal.
5. Adhesive: As recommended by markerboard manufacturer.

2.3 ACCESSORIES

- A. Metal Trim and Accessories: Fabricate frames and trim of not less than 0.062-inch thick aluminum alloy, size and shape as indicated, to suit type of installation. Provide straight, single-length units wherever possible; keep joints to a minimum. Miter corners to a neat, hairline closure.
- B. Where the size of boards or other conditions exist that require support in

addition to the normal trim, provide structural supports or modify the trim as indicated or as selected by the Architect from the manufacturer's standard structural support accessories to suit the condition indicated.

- C. Field-Applied Trim: Provide the manufacturer's standard slip-on aluminum trim, to eliminate grounds.

2.4 FABRICATION

- A. Porcelain Enamel Markerboards: Laminate facing sheet and backing sheet to core material under pressure with manufacturer's recommended flexible, waterproof adhesive.
- B. Corkboard
 - 1. Cork: Fine grain natural cork, homogeneous composition.
 - 2. Fiberboard: Manufacturer's standard.
 - 3. Adhesives: As recommended by reviewed tackboard manufacturer.
- C. Assembly: Provide factory-assembled visual display units, except where field- assembled units are required.
 - 1. Make joints only where total length exceeds maximum manufactured length. Fabricate with the minimum number of joints, balanced around the center of the board, as acceptable to the Architect.
 - 2. Provide the manufacturer's standard vertical joint system between abutting sections of visual display boards.

2.5 METAL FINISHES

- A. General: Comply with NAAMM MFG for recommendations relative to application and designations of finishes.
- B. Organic Coating: Thermosetting modified acrylic enamel primer/topcoat system complying with AAMA 603.8 except with minimum dry film thickness of 1.5 mils, medium gloss.
- C. Color. As selected by the Architect.

3.0 EXECUTION

3.1 INSTALLATION

- A. Deliver factory-built visual display boards completely assembled in 1 piece without joints, wherever possible. Where dimensions exceed panel size, provide

2 or more pieces of equal length as acceptable to the Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site. Use splines at joints to maintain surface alignment.

- B. Install units in locations and at mounting heights indicated and in accordance with the manufacturer's instructions. Keep perimeter lines straight, plumb, and level. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for a complete installation.
- C. Coordinate job-site assembled units with grounds, trim, and accessories. Join parts with a neat, precision fit.

3.2 ADJUST AND CLEAN UP

- A. Verify that accessories required for each unit have been properly installed and that operating units function properly.
- B. Clean units in accordance with the manufacturer's instructions. Break in visual display boards only as recommended by the manufacturer.

END OF SECTION

SECTION 101400 - SIGNAGE

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
 - 1. Panel Signs.
 - a. Room identification.
 - b. Toilet Rooms.
 - c. Miscellaneous information signage.
 - d. Fire Protection signage.
 - e. Tactile exit signage.
 - 2. Accessibility decal.
 - 3. Dimensional characters.
 - a. Cutout.
 - 4. Adhered Vinyl Lettering.
- C. Review of Construction Drawings: Bidders shall, as a part of their bid, call specific attention to any construction details, materials, methods of fabrication or other similar items which they consider to be impractical or not in keeping with good industry practice. Requests for change orders for substitutions to address such items after award of contract shall not be accepted.
- D. Allowance for Submittals: Allow for thorough and complete preparation of all submittal items described at Section 1.05, for delivery and/or shipping of same, and for resubmittal(s) as required until approval has been obtained for all items.
- E. Provide and install non-illuminated interior and exterior identifying devices herein referred to as "signage," including:
 - 1. Wall-mounted interior and exterior signage for room identification.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 079000 - Joint Protection: Sealants and Caulking
- C. Section 054000 – Cold Formed Metal Framing
- D. Section 099100 - Painting
- E. Divisions 22, 23, and 26 for coordination purposes
- I. Divisions 31 and 32 for coordination purposes

1.3 REFERENCES

- A. Americans with Disabilities Act (ADA).
- B. American National Standards Institute (ANSI):
 - 1. 1998 ICC/ANSI A117.1 - Accessible and Usable Buildings & Facilities
- C. American Society for Testing and Materials (ASTM):
 - 1. ASTM B209 - Specification for Aluminum and Aluminum-Alloy Sheet and Plate
 - 2. ASTM D4956 - Specification for Retroreflective Sheeting for Traffic Control
- D. American Architectural Manufacturer's Association (AAMA):
 - 1. AAMA 611 - Voluntary Specifications for Anodized Architectural Aluminum
 - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
- E. National Association of Architectural Metal Manufacturers (NAAMM):
- F. Metal Finishes Manual for Architectural and Metal Products
- G. CalDAG - California Disabled Accessibility Guidebook.

1.4 STRUCTURAL DESIGN AND ENGINEERING

- A. Details in the Drawings indicate a general design approach for sign structures but do not necessarily include the specific fabrication details required for the complete structural integrity of the signs, nor do they necessarily consider

preferred shop practices of individual contractors. Such specific fabrication details shall be provided by the Contractor, who shall ensure that all signs withstand any and all static, dynamic and/or erection loads that act upon them, including all such loads associated with handling, erecting, and servicing.

- B. Contractor shall furnish a complete structural design for each and every sign type, incorporating all reasonable safety factors necessary to protect the Owner and Contractor against public liability.
 - 1. All such structural designs shall meet applicable local, state, and national codes, as well as testing laboratory listings, where required.
- C. Contractor shall be responsible for the engineering and internal construction of all signs, and shall submit shop drawings and details for review by the Architect. Shop drawings for Sign Type EX.1 shall be designed and stamped by a licensed Engineer currently registered in the State of California. Said stamped shop drawings shall specify all structural components and methods required to withstand the design wind load and design seismic load at the location of the sign(s).
 - 1. All structural design shall meet applicable local, state, and national codes, as well as testing laboratory listings, where required.
 - 2. Seismic Forces: Engineered shop drawings shall specify all necessary measures to withstand seismic forces at the project location.
 - 3. Wind Load: Engineered shop drawings shall reflect the soil type and compaction and the design wind load at the project location. Assume maximum wind of 80mph and wind pressure of 12.5 psf unless otherwise indicated. Comply with the requirements of Chapter 16 or 6A, Section 1609, of the CBC as apply.

1.5 COORDINATION

- A. Coordinate placement of anchorage devices and concealed framing and backing in other sections with templates for installing signs to ensure that signs can be supported and installed as indicated.

1.6 SUBMITTALS

- A. Presubmittal Conference: Coordinate with the Architect prior to preparation of submittals to confirm submittal requirements and schedule.
- B. Product Data: If requested by Architect, submit manufacturers' catalog sheets, brochures, diagrams, schedules, charts, illustrations, test results and/or other standard descriptive data.

1. Mark up each copy to identify pertinent materials, products or models.
 2. Show dimensions and clearances required, performance characteristics and capacities, and wiring diagrams and/or controls as apply.
- C. Qualification Data: For Installer.
- D. Sample Warranty: For special warranty.
- E. Shop Drawings:
1. All shop drawings shall be neat, well organized and clearly legible. Elevations and plan views from the Construction Drawings may be reproduced for the sake of expedience where appropriate.
 2. All shop drawings shall be drawn to scale and not subsequently reduced to fit a drawing format.
 3. Submit elevations and plan views for all sign types, including graphic layouts, complete dimensions, materials, and locations of all exposed fasteners, colors and finishes. Determine the total quantity for each sign type and note it in the shop drawings.
 4. Submit comprehensive section drawings for sign types where applicable, including sections of all typical members. Show fabrication and installation details, including details for securing members to one another, to building structures, and/or to site work. Show interior construction, reinforcements, anchorages, components and finishes. Reproduction of section drawings shown in the Construction Drawings shall not be acceptable.
 5. Site Condition Verification: Where required by the Architect for specific items, Contractor shall inspect site to confirm installation conditions, then submit shop drawings and/or written documentation for approval indicating proposed mounting devices.
 6. Exact replications of Bid documents will be rejected.
- F. Samples:
1. Panel Signs: 12 inches by 12 inches.
 2. Color and Finish: Submit 3 each, 12 inch x 12 inch samples of all paint colors, screen colors, vinyl colors and material finishes. All paint and screen colors are to be applied to the appropriate substrate.

- a. Contractor to submit verification of paint manufacturer used for submittal.
 - b. Prior to submittal, Contractor shall verify that all colors submitted as samples match accurately the samples or specifications provided by Architect.
3. Typeface(s): Submit complete typeface font(s), including upper and lower case letters, numbers and punctuation, for all typeface(s) specified. Also submit samples of letter and word spacing for each cap height specified.
- a. Dimensional Characters: Full-size samples of each type of cutout character (letter, number, and graphic element).
- G. Quality Control:
1. Samples, mock-ups and prototypes shall not be permanently installed, but shall be retained by the Architect for record and quality control, unless otherwise noted by the Architect.
 2. If requested by Architect, submit manufacturer's installation instructions for each type of specialty sign. Include only pages which are pertinent, or manufacturer's standard drawings modified to delete non-applicable data.
- H. Closeout:
1. Maintenance Data: For signs to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- C. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.
- D. Do not scale drawings for dimensions. Use only the written dimensions indicated on the Drawings, unless such be found in error. Contractor shall verify and be responsible for all dimensions and conditions shown by the Drawings, and shall visit the site to inspect and verify field conditions prior to fabrication and installation. The Architect shall be notified, in writing, of

all discrepancies on Drawings, in field dimensions or conditions, and of changes required in construction details.

- E. Provide each type of sign as a complete unit produced by a single manufacturer, including all required mounting accessories, fittings and fastenings.
- F. All details shown in the Drawings shall be followed for exterior appearance. Minor changes in interior construction will be accepted in order to conform to Contractor's shop practices or engineering requirements when, in the Architect's sole judgment, such changes do not detract materially from design concept or intent. Contractor shall circle all such changes on the shop drawings.
- G. Completed work shall be structurally sound, and free from scratches, distortions, chips, breaks, blisters, holes, splits or other disfigurements considered as imperfections for the specific material.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Use all means necessary to protect signs before, during and after installation.
 - 1. In the event of damage, make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the City.
- B. Deliver materials to jobsite in manufacturer's original unopened factory packaging.
- C. Inspect materials at time of delivery to assure that specified products have been received.
- D. Store materials in original packaging in a climate controlled environment and away from direct sunlight.

1.9 FIELD CONDITIONS

- A. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication and indicate measurements on Shop Drawings.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer's agrees to repair and replace components of signs that fall in materials or workmanship within specified warranty period.
 - 1. Failures include: but are not limited to, the following:

- a. Deterioration, including fading of metal and polymer finishes beyond normal weathering.
 - b. Deterioration of embedded graphic images.
 - c. Separation of determination of sheet materials and components.
2. Warranty Period:
- a. Polymer-based Panel Signs: 2 years from date of Substantial Completion.
 - b. Dimensional Character Metal Finish: 5 years from date of Substantial Completion.

2.0 PRODUCTS

2.1 MANUFACTURER

- A. Interior Signage (Non-Metal): Best Sign Systems, Inc., 1202 N. Park Ave., Montrose, CO 81401, 1-800-235-2378 or approved equal.

2.2 PLASTIC/ACRYLIC SIGNS

- A. Acceptable Product: "MP Plastic"
1. Two-color scratch resistant, non-static, fire retardant, washable melamine laminate with a non-glare surface. Color to be selected by Architect.
 2. Sign plaque material shall consist of melamine laminate with phenolic core, approximately 1/4" thick, with background painted a contrasting color.
 - a. Exterior Signs: Rated for exterior installation.
 3. Signs shall be of one-piece construction; added-on and/or engraved characters are unacceptable.
 4. Lettering:
 - a. Tactile characters (letters, numerals, and symbols) on signs shall be raised 1/32" from sign plate face.
 - b. Character font style shall be "Sans Serif" in uppercase and be accompanied by Grade 2 Braille, per 1117B.5.5.1
 - c. Raised characters on all signs shall be between 5/8" and 2" high.
 - d. Characters shall be centered on sign.

- e. Characters and background shall be eggshell, matte or other approved non-glare finish. Characters shall contrast with their background - either light characters on a dark background or dark characters on a light background.

5. Sign Panel Frame:

- a. Material: Aluminum.
- b. Frame Profile Dimensions: 3/32 inch by 1/2 inch by 1/2 inch angle.
- c. Corner Condition: Mitered.
- d. Backing Plate: 1/8 inch thick polymer backup panel fabricated to fit tightly within frame.

6. Sign Sizes:

- a. Room identification signs shall be 9" x 9"
- c. Emergency Exit shall be 9" x 9"
- d. Exit signs shall be 9" x 9"
- e. Maximum Occupancy signs shall be 9" x 9"

B. Accessories:

- 1. Vinyl foam tape.

C. Braille Symbols

- 1. Contracted California Grade 2 Braille shall be used wherever Braille symbols are specifically required.
- 2. Dots shall be 1/10 inch on centers in each cell with 2/10 inch space between cells.
- 3. Dots shall be raised a minimum of 1/40 inch above the background.

D. Mounting Location and Height: Where permanent identification is provided for rooms and spaces, raised letters shall be provided and shall be accompanied by Braille in conformance with Section 3105A.(e)7, The CalACS Accessibility Standards Interpretive Manual.

- 1. Signs shall be installed on the wall adjacent to the latch outside of the door. Where there is no wall space on the latch side, including at double leaf doors, signs shall be placed on the nearest adjacent wall, preferably on the right.²

2. Mounting height: 60 inches above the finish floor to the center line of the sign.
3. Mounting location shall be determined so that a person may approach within 3 inches of signage without encountering protruding objects or standing within the swing of a door.

2.3 POSTING OF ROOM CAPACITY

- A. Any room having an occupant load of 50 or more where fixed seats are not installed, and which is used for classroom, assembly or similar purpose, shall have the capacity of the room posted in a conspicuous place on an approved sign near the main exit from the room. Posting shall be by means of a durable sign having contrasting color from the background to which it is attached. Such signs shall be maintained legible by the City or the City's authorized agent and shall indicate the number of occupants permitted for each room use. No person shall deface or remove such signs except as authorized by the enforcing agent.

2.4 PICTOGRAMS

- A. Pictogram where indicated, shall have a field height of 6 inches minimum. Characters and Braille shall not be located in the pictogram field.
 1. Contrast: Pictogram shall contrast with background field.
 2. Finish: Both pictogram and background field shall have non-glare finish.
 3. Corresponding descriptive text and Braille shall be located directly below pictogram field.

2.5 PRESSURE-SENSITIVE ADHESIVE-APPLIED ACCESSIBILITY SYMBOL

- A. International Symbol of Accessibility: 6 inch x 6 inch symbol fabricated from opaque nonreflective vinyl film, 0.0035-inch thickness, with pressure-sensitive adhesive backing suitable for both exterior and interior applications.
 1. Colors:
 - a. Field: Blue, Federal Standard 595B, Color No. 15090.
 - b. Symbol: White.

2.6 DIMENSIONAL CHARACTERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufactures or equal:
 1. A.R.K. Ramos.

2. ASI-Modulex, Inc.

3. Gemini, Inc.

B. Materials:

1. Aluminum sheet: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

2. Aluminum Extrusions: ASTM B221, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.

C. Cutout Characters: Provide characters with uniform faces, square-cut, smooth edges; precisely formed lines and profiles.

1. Material: Aluminum sheet.

2. Typeface: As indicated.

3. Character Height: As indicated.

4. Character Depth: As indicated.

5. Finish: Acrylic polyurethane baked-enamel paint, recommended by manufacturer for optimum adherence to surface, and is UV-resistant and water-resistant for colors and exposure indicated.

a. Product: Subject to compliance with requirements, provide the following topcoat material:

i) Matthews Paint Company: Matthews Satin VOC MAP.

b. VOC Content: No more than that allowed by local and federal regulations when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

c. Primer: As recommended in writing for intended substrate material by manufacturer of topcoat material.

d. Color: Custom color to match color chip provided by Architect.

6. Mounting: Non-corroding studs suitable for substrates being anchored to.

2.7 ADHERED VINYL LETTERING

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufactures or equal:

1. www.Signs.com.

B. Materials:

1. High performance 2-mil (.002 inch) thick cast film high quality adhesive-backed vinyl.

C. Cutout Characters: Provide characters with uniform faces, square-cut, smooth edges; precisely formed lines and profiles.

1. UV Resistance: UV protectants in material for outdoor vibrancy.
2. Moisture Resistance: Water-resistant.
3. Temperature Range: -40F to 225F.
4. Character Height: As indicated.
5. Character Depth: As indicated.
6. Print Method: Cut from full size vinyl sheets, no splicing.
7. Color: White.

2.8 EXTERIOR POLE-MOUNTED SIGNS

A. General; Freestanding pole-mounted sign for exterior installation.

1. Sign Face: Aluminum sheet, ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at least the strength and durability properties of Alloy 505-H32.
 - a. Thickness: 0.080 inch.
 - b. Round all corners to 1/2 inch radius.
2. Reflective Sheeting: Reflective sheet with pressure-sensitive adhesive backing; ASTM D 4956, Type I.
3. Sign Type, Text and Graphic Content: As shown on Drawings.
4. Sign Mounting Height: As shown on Drawings.
5. Pole: Steel pipe, ASTM A 53, standard weight, (Schedule 40), standard steel pipe, 2 inch nominal size (2.375 inch outside diameter).

- a. Finish: Hot-dip galvanize to comply with ASTM A 123.
- 6. Footing: Portland cement concrete.
 - a. Materials:
 - i) Portland Cement: ASTM C 150, Type I or II.
 - ii) Aggregates: ASTM C 33.
 - iii) Water: Clean and potable.
 - b. Concrete Mixes: Normal-weight concrete with not less than 2500 psi compressive strength (28 days), 3 inch slump, and 1 inch maximum size aggregate.
 - i) Measure, batch, and mix Project-site-mixed concrete according to ASTM C 94.
- B. Fabrication:
 - 1. Fabricate sign face from single sheet without splice or joints.
 - 2. Prior to application of reflective sheeting, pretreat and clean sign face in accordance with written instructions of reflective sheeting manufacturer.
 - 3. Apply reflective sheeting without wrinkles, stretching, tearing, or damage in accordance with written instructions of reflective sheeting manufacturer.
 - 4. Apply text and graphics with clean, sharp edges, using inks of a type and quality as approved for compatibility by manufacturer of reflective sheeting.

2.9 PARKING STALL SIGNS

- A. Standard Accessible Parking Stall: Complying with requirements of California Building Code and U.S. Justice Department's 2010 ADA Standards for Accessible Design.
 - 1. Sign: As shown on Drawings.

2.10 TOW WARNING SIGN

- A. Complying with 2016 California Building Code Chapter 11B.
 - 1. Sign: As shown on Drawings.

3.0 EXECUTION

3.1 SURFACE CONDITIONS

- A. Surface Conditions: Prior to installation of signs, examine areas and conditions in which the signage system(s) will be installed to verify that all surfaces are ready and painted.
 - 1. Complete all finishing operations, including painting, before installing signage.
 - 2. Wall surface shall be dry and free from dirt, grease and loose paint.

3.2 INSTALLATION

- A. Install materials in accordance with manufacturer's written instructions for installation.
- B. Locate sign units and accessories as indicated on the Drawings. See interior and exterior sign schedules below.
- C. Install signs level, plumb, and at heights indicated.
- D. Mounting height for all door-mounted signage shall be 60" centered from floor, centered to the center line of the sign.
- E. Mounting location and height for wall-mounted signage:
 - 1. Signs shall be installed on wall adjacent to the latch side of the door. Where there is no wall space on the latch side, sign shall be placed on the nearest adjacent wall, preferably to the right.
 - 2. Mounting height shall be 60" above finish floor, centered to the center line of the sign, unless noted otherwise.
 - a. Maximum Occupancy signs shall be mounted 80" above finished floor to center line of sign.
 - 3. Mounting location shall be determined so that a person may approach within 3" of signage without encountering protruding objects or standing within the swing of a door.
 - 4. Verbal description as to restroom usage, i.e. Men's, Women's, etc., shall be placed directly below the pictogram signage.
- F. Adhesive: Follow manufacturer's instruction for complete application of recommended adhesive to ensure proper bonding of signage to the surface specified on the drawings.
- G. Vinyl Lettering:

1. Painted surfaces should be allowed 2-3 weeks to dry and cure properly before applying adhered vinyl lettering.
2. Follow manufacturer's instruction for complete application of recommended adhesive to ensure proper bonding of signage to the surface specified on the drawings.

3.3 SIGN SCHEDULES

- A. All signs shall be engraved 1/4" plastic laminate. For sign design (where lettering/symbols are to appear on sign), see Sheet A7.4 for details. All Signage in Table 1 will be of this type unless otherwise noted. Refer to part 2.2 of this Section.
- B. All Exterior signs shall be metal and are referenced in Table 2. Refer to part 2.3 of this Section.
- C. Illuminated Exit signs – see Electrical Drawings for details.

3.4 SIGN LOCATIONS

- A. All signs identifying permanent rooms and spaces shall be located in compliance with CBC 1117B.5.9: Center of sign to be 5'0" above finish floor. Sign to be located at latch side of door, or, if there is insufficient wall space, on the nearest wall, preferably to the right.
- B. Symbol signs on restroom doors shall be located in compliance with CBC 1115B.5: Center of sign to be 5'0" above finish floor. Sign to be centered left to right on door.

3.5 SITE CLEAN UP

- A. Final cleanup:
 1. Clean and/or repair all evidence of installation work or damage to site work or other adjacent surfaces prior to completion of work.
 2. Clean up work area after all installation has been completed. Restore all disturbed ground cover.
 3. Remove all protective materials and dispose of properly off site.

3.6 CLEAN UP AND PROTECTION

- A. At completion of installation, clean all sign surfaces in accordance with manufacturer's instructions.
- B. Protect all signs from damage until acceptance by Architect; repair or

replace damaged units as required.

- C. Clean and/or repair all evidence of installation work or damage to adjacent surfaces prior to completion of work.
- D. Remove all protective materials and dispose of properly off site.

3.7 CONTRACT CLOSE-OUT ITEMS

- A. Provide Owner with one quart of paint for each paint color specified.
- B. Provide Owner with written instructions for proper cleaning of the signs. Note any solvents that should not be used.

END OF SECTION

SECTION 102113 SOLID PLASTIC TOILET COMPARTMENTS

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install toilet compartments as shown on the project Drawings.
- D. Provide and install privacy screens as shown on the project Drawings.

1.2 RELATED SECTIONS

- A. Section 055000 - Metal Fabrications
- B. Section 061000 - Rough Carpentry
- C. Section 099565 - Epoxy Coatings
- D. Section 102119 – Solid Plastic Shower and Dressing Compartments

1.3 REFERENCES

- A. UL – GREENGUARD certified low emitting materials.
- B. ASTM – B221 – Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire Profiles and Tubes.
- C. ASTM – A167 – Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
- D. E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. National Fire Protection Association, 101 Life Safety Code 1991 Edition, Chapters 5, 6, 8-30.
- F. ANSI A117-1986 Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

- G. 2016 Title 24, California Code of Regulations, Parts 2, 3, and 5.
- H. ADA, Accessibility Guidelines for Buildings and Facilities, Federal Register Volume 56, Number 144, Rules and Regulations.

1.4 SYSTEM DESCRIPTION

- A. Compartment Configurations:
 - 1. Toilet Partitions: Floor mounted, overhead braced.
 - 2. Urinal Screens: Wall mounted.

1.5 SUBMITTALS

- A. Comply with pertinent provisions of Volumes 1 and 2 of these Contract Documents.
- B. Submittals for Review:
 - 1. Shop Drawings: Include dimensioned layouts, elevations, trim, closures, accessories and anchorage. Show fabrication and erection of component assemblies to extent not fully described by manufacturer's data sheets.
 - 2. Product Data: Provide manufacturer's descriptive data, installation instructions, and replacement parts information.
 - 3. Samples: 3 x 3 inch samples showing full manufacturer's range.
- C. Sustainable Design Submittals:
 - 1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content.
 - 2. Regional Materials: Certify distance between manufacturer and Project and between manufacturer and extraction or harvest point in miles.

1.6 QUALIFY ASSURANCE

- A. Lockers and benches shall be the products of a single manufacturer as specified herein.
- B. Manufacturer Qualifications: Minimum 10 years of experience in manufacture of solid plastic lockers and benches with products in satisfactory use under similar conditions.

- C. Installer Qualifications: Minimum 5 years of experience in work of this Section, certified installer through manufacturer's installation certification program.
- D. Indoor Environmental Quality Certification: Provide certificate indication that products have been certified under one of the following programs or a comparable certification acceptable to Owner.
 - 1. GREENGUARD Certification.
 - 2. GREENGUARD GOLD Certification.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver, handle and store materials in accordance with manufacturer's instructions.
- B. Deliver items in manufacturer's original unopened protective packaging.
- C. Store materials in a clean, dry place.
- D. Handle in a manner to prevent damage to finished surfaces.
- E. HDPE materials to be tested per NFPA 286 (CBC 803.62)
- F. Protect plastic lockers and benches from exposure to direct sunlight.

1.7 WARRANTY

- A. Furnish manufacturer's written warranty covering all plastic components and plastic hardware against breakage, corrosion, and delamination, including panels, doors, and stiles for a period of 25 years.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Scranton Products, 801 Corey Street, Scranton, PA 18505, 1-800-445-5148, www.scrantonproducts.com, or approved equal.

2.2 MATERIALS - GENERAL

- A. Provide materials selected for surface flatness and smoothness.
- B. All exposed surfaces shall be free of saw marks. Exposed surfaces exhibiting defects, discolorations, and other imperfections are not acceptable.
- C. High Density Polyethylene: polyethylene thermoplastic formed into solid plastic components with homogeneous color throughout, with smooth orange peel finish.

- D. Heavy Duty Extruded Aluminum: B221, 6063-T6.
- E. Chromium Plated Steel: A167.
- F. Recycled Content: Minimum 25 percent.

2.3 TOILET DOOR, PANELS, AND PILASTERS

A. Compartment Materials:

- 1. Material: High density polyethylene (HDPE) plastic
- 2. Thickness: 1 inch
- 3. Edge: 1/4 inch radius.
- 4. Absorbency: Waterproof and nonabsorbent with self-lubricating surface, resistant to marks by pens, pencils, markers, and other writing instruments.
- 5. Color: To be selected from manufacturer's full color range.

B. Components:

1. Doors and Dividing Panels:

- a. Height: 55 inches high, mounted 14 inches above finished floor.

2. Pilasters:

- a. Height: 82 inches high, fastened to pilaster sleeves with stainless steel tamper resistant Torx head sex bolt.

3. Pilaster Sleeves: 3 inches high, one-piece molded HDPE, secured to pilaster with stainless steel tamper resistant Torx head sex bolt.

4. Wall Brackets: Double ear continuous 54 inch long heavy-duty aluminum with bright dip anodized finish. Fasten to pilaster and panels with stainless steel tamper resistant Torx head sex bolts.

5. Headrails: Heavy-duty extended aluminum, anti-grip design, clear anodized finish with stainless steel tamper resistant Torx head sex bolts.

C. Hardware:

1. Hinges: Continuous 71 inch long helix, 14 gauge, #304 stainless steel, 1/4 inch pin, welded and ground, brush finish, pre-drilled. Fasten to pilaster and panels with stainless steel tamper resistant Torx head sex bolts.

2. Door Strike and Keeper:

- a. Material: Heavy-duty extruded aluminum, bright dip anodized finish with wrap-around flanges secured to pilasters with stainless steel tamper resistant Torx head sex bolts.
 - b. Bumper: Extruded black vinyl.
 - c. Latch and Housing:
 - i. Material: Heavy-duty extruded aluminum.
 - ii. Latch Housing: Bright dip anodized finish.
 - d. Slide bolt and button: Black anodized finish.
3. Coat Hook/Bumper:
 - a. Combination type, chrome plated Zamak.
 - b. Equip accessible doors with second door pull and door stop.
 4. Door Pulls: Chrome plated Zamak.

2.5 URINAL SCREENS

A. Screen Materials:

1. Material: High density polyethylene (HDPE) plastic
2. Thickness: 1 inch
3. Edge: 1/4 inch radius.
4. Absorbency: Waterproof and nonabsorbent with self-lubricating surface, resistant to marks by pens, pencils, markers, and other writing instruments.
5. Height: 48 inches
6. Mount Height: 14 inches above finished floor.
5. Color: To be selected from manufacturer's full color range.

B. Hardware:

1. Wall Brackets: Double ear continuous 41 inch long heavy-duty aluminum with bright dip anodized finish. Fasten to pilaster and panels with stainless steel tamper resistant Torx head sex bolts.

3.0 EXECUTION

3.1 INSTALLATION

- A. Install compartments and panels in accordance with manufacturer's instruction and approved Shop Drawings.

- B. Set plumb, rigid and aligned.
- C. Attach compartments and panels to supporting construction with anchors best suited to substrate conditions.
- D. Not Acceptable: Evidence of cutting, drilling or patching.

3.2 ADJUSTING AND CLEANING

- A. Adjust doors and latches to operate correctly.
- B. Clean exposed surfaces, hardware, interior surfaces and ensure finished work is left free of imperfections.
- C. Protect installation from on-going construction.

END OF SECTION

SECTION 102119 - SOLID PLASTIC SHOWER AND DRESSING COMPARTMENTS

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install shower and dressing compartments as shown on the project Drawings.

1.2 RELATED SECTIONS

- A. Section 055000 - Metal Fabrications
- B. Section 061000 - Rough Carpentry
- C. Section 099565 - Epoxy Coatings
- D. Section 102113 - Solid Plastic Toilet Compartments

1.3 REFERENCES

- A. UL – GREENGUARD certified low emitting materials.
- B. ASTM – B221 – Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire Profiles and Tubes.
- C. ASTM – A167 – Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
- D. E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. National Fire Protection Association, 101 Life Safety Code 1991 Edition, Chapters 5, 6, 8-30.
- F. ANSI A117-1986 Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

- G. 2016 Title 24, California Code of Regulations, Parts 2, 3, and 5.
- H. ADA, Accessibility Guidelines for Buildings and Facilities, Federal Register Volume 56, Number 144, Rules and Regulations.

1.4 SYSTEM DESCRIPTION

- A. Compartment Configurations:
 - 1. Shower Partitions: Floor mounted, overhead braced.
 - 2. Dressing benches: Partition mounted.

1.5 SUBMITTALS

- A. Comply with pertinent provisions of Volumes 1 and 2 of these Contract Documents.
- B. Submittals for Review:
 - 1. Shop Drawings: Include dimensioned layouts, elevations, trim, closures, accessories and anchorage. Show fabrication and erection of component assemblies to extent not fully described by manufacturer's data sheets.
 - 2. Product Data: Provide manufacturer's descriptive data, installation instructions, and replacement parts information.
 - 3. Samples: 3 x 3 inch samples showing full manufacturer's range.
- C. Sustainable Design Submittals:
 - 1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content.
 - 2. Regional Materials: Certify distance between manufacturer and Project and between manufacturer and extraction or harvest point in miles.

1.6 QUALIFY ASSURANCE

- A. Lockers and benches shall be the products of a single manufacturer as specified herein.
- B. Manufacturer Qualifications: Minimum 10 years of experience in manufacture of solid plastic lockers and benches with products in satisfactory use under similar conditions.

- C. Installer Qualifications: Minimum 5 years of experience in work of this Section, certified installer through manufacturer's installation certification program.
- D. Indoor Environmental Quality Certification: Provide certificate indication that products have been certified under one of the following programs or a comparable certification acceptable to Owner.
 - 1. GREENGUARD Certification.
 - 2. GREENGUARD GOLD Certification.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver, handle and store materials in accordance with manufacturer's instructions.
- B. Deliver items in manufacturer's original unopened protective packaging.
- C. Store materials in a clean, dry place.
- D. Handle in a manner to prevent damage to finished surfaces.
- E. HDPE materials to be tested per NFPA 286 (CBC 803.62)
- F. Protect plastic lockers and benches from exposure to direct sunlight.

1.7 WARRANTY

- A. Furnish manufacturer's written warranty covering all plastic components and plastic hardware against breakage, corrosion, and delamination, including panels, doors, and stiles for a period of 25 years.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Scranton Products, 801 Corey Street, Scranton, PA 18505, 1-800-445-5148, www.scrantonproducts.com, or approved equal.

2.2 MATERIALS - GENERAL

- A. Provide materials selected for surface flatness and smoothness.
- B. All exposed surfaces shall be free of saw marks. Exposed surfaces exhibiting defects, discolorations, and other imperfections are not acceptable.
- C. High Density Polyethylene: polyethylene thermoplastic formed into solid plastic components with homogeneous color throughout, with smooth orange peel finish.

- D. Heavy Duty Extruded Aluminum: B221, 6063-T6.
- E. Chromium Plated Steel: A167.
- F. Recycled Content: Minimum 25 percent.

2.3 DOOR, PANELS, AND PILASTERS

A. Compartment Materials:

- 1. Material: High density polyethylene (HDPE) plastic
- 2. Thickness: 1 inch
- 3. Edge: 1/4 inch radius.
- 4. Absorbency: Waterproof and nonabsorbent with self-lubricating surface, resistant to marks by pens, pencils, markers, and other writing instruments.
- 5. Color: To be selected from manufacturer's full color range.

B. Components:

1. Doors and Dividing Panels:

- a. Height: 76 inches high, mounted 6 inches above finished floor.

2. Pilasters:

- a. Height: 82 inches high, fastened to pilaster sleeves with stainless steel tamper resistant Torx head sex bolt.

3. Pilaster Sleeves: 3 inches high, one-piece molded HDPE, secured to pilaster with stainless steel tamper resistant Torx head sex bolt.

4. Wall Brackets: Double ear continuous 76 inch long heavy-duty aluminum with bright dip anodized finish. Fasten to pilaster and panels with stainless steel tamper resistant Torx head sex bolts.

5. Headrails: Heavy-duty extended aluminum, anti-grip design, clear anodized finish with stainless steel tamper resistant Torx head sex bolts.

C. Hardware:

1. Hinges: Continuous 71 inch long helix, 14 gauge, #304 stainless steel, 1/4 inch pin, welded and ground, brush finish, pre-drilled. Fasten to pilaster and panels with stainless steel tamper resistant Torx head sex bolts.

2. Door Strike and Keeper:

- a. Material: Heavy-duty extruded aluminum, bright dip anodized finish with wrap-around flanges secured to pilasters with stainless steel tamper resistant Torx head sex bolts.
 - b. Bumper: Extruded black vinyl.
 - c. Latch and Housing:
 - i. Material: Heavy-duty extruded aluminum.
 - ii. Latch Housing: Bright dip anodized finish.
 - d. Slide bolt and button: Black anodized finish.
3. Coat Hook/Bumper:
 - a. Combination type, chrome plated Zamak.
 - b. Equip accessible doors with second door pull and door stop.
 4. Door Pulls: Chrome plated Zamak.

2.5 DRESSING BENCHES

A. Bench Materials:

1. Material: High density polyethylene (HDPE) plastic
2. Thickness: 1 inch
3. Edge: 1/4 inch radius.
4. Absorbency: Waterproof and nonabsorbent with self-lubricating surface, resistant to marks by pens, pencils, markers, and other writing instruments.
5. Dimensions: 18 inches wide x length shown on Drawings.
6. Mount Height: 17 inches maximum above finished floor.
5. Color: To be selected from manufacturer's full color range.

B. Hardware:

1. Partition Brackets: Manufacturer's recommended bracket of heavy-duty aluminum with bright dip anodized finish. Fasten to pilaster, panels and wall with stainless steel tamper resistant Torx head sex bolts.

3.0 EXECUTION

3.1 INSTALLATION

- A. Install compartments and panels in accordance with manufacturer's instruction and approved Shop Drawings.

Project: 855 East Laurel Drive Emergency Shelter

Project No. 8875

Bid No. 10736

- B. Set plumb, rigid and aligned.
- C. Attach compartments and panels to supporting construction with anchors best suited to substrate conditions.
- D. Not Acceptable: Evidence of cutting, drilling or patching.

3.2 ADJUSTING AND CLEANING

- A. Adjust doors and latches to operate correctly.
- B. Clean exposed surfaces, hardware, interior surfaces and ensure finished work is left free of imperfections.
- C. Protect installation from on-going construction.

END OF SECTION

SECTION 102613 - CORNER GUARDS

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install full height surface-mounted rigid vinyl corner guards at wall ends as shown on project Drawings, including mounting hardware, accessories and trim.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions.
- B. Section 092900, Gypsum Board
- C. Section 099100, Painting

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each product specified herein, including complete installation instructions.
- B. Shop Drawings: Submit Shop Drawings showing locations of each item and installation details. Provide elevations of nonstandard conditions.
- C. Selection Samples: Submit color charts consisting of actual product pieces demonstrating full range of available colors for initial color selection.
- D. Verification Samples: Submit 12-inch long assemblies in color specified.

1.4 QUALITY ASSURANCE

- A. Provide test reports showing compliance with the performance specified for:
 - 1. Fire-rated properties.
 - 2. Accessibility and safety properties.
 - 3. Impact strength.

B. Performance Requirements:

1. Pullout capacity complying with the State of California requirements, as administered by the Office of Statewide Health Planning and Development (OSHPD), and ANSI A117.1 requirements.
2. Class A rating per NFPA standards.
 - a. ASTM E84 flame spread 5 or less; smoke developed 180 or less.
 - b. ULC CAN4-S102-M83 flame spread 10 or less; smoke developed 250-330 or less.

C. Installer: Installer must have a minimum of 5 years successful experience with the work as required in this Section.

1.5 WARRANTY

- A.** Manufacturer's standard warranty shall protect materials and workmanship against defects when installed in conformance with manufacturer's installation instructions.
1. Liability is limited to repair or replacement of materials only.

2.0 PRODUCTS

2.1 MANUFACTURER

- A.** Pawling Corporation, Architectural Products Division; 32 Nelson Hill Rd., Wassaic, NY 12592, 1-800-431-3456, www.pawling.com, or approved equal.

2.2 MATERIALS

- A.** Vinyl Corner Guards: Refer to Drawings for location
1. PRO-TEK Corner Guards, Model CG-10R
 - a. 3" wide wings, .100" thick rigid vinyl cover over continuous .100" thick 100% recycled extruded vinyl retainer; high-impact rigid vinyl compounds with an embossed, matte finish:
 - i. Corner guards shall be 90-degree angled
 - b. Provide matching end "closure" caps for corner guards that do not extend to ceiling.

- c. Corner guards and components shall pass when tested in accordance with requirements for Flammability, Pull Out and Point Load, Impact Resistance, and Chemical and Stain Resistance tests.
 - d. Height: 4'-0"
 - e. Color: Submit color options to Architect. Vinyl Finish shall be a standard matte shallow-etched granular surface.
- C. Accessories:
- 1. Provide appropriate fasteners and accessories as required by manufacturer to properly complete corner guard installation as specified herein.
 - 2. Accessories shall allow for transitions around corners and return to wall at appropriate locations such as door openings.

3.0 EXECUTION

3.1 EXAMINATION

- A. Verify that walls are in proper condition to receive installation of corner guards.
- B. Surface-mounted corner guards may not be installed until all other wall finishes have been completed.

3.2 INSTALLATION

- A. Install corner guards in compliance with manufacturer's written installation instructions.
- B. Surface Preparation: Clean substrate to remove dust and debris.
- C. Acclimate materials to building conditions for at least 24 hours prior to installation.

3.3 ADJUSTING AND CLEANING

- A. Verify that corner guards are plumb and rigidly secured to substrate; make any adjustments required.
- B. Clean corner guards and adjacent areas of installation using materials and methods as recommended by manufacturer.
- C. Remove from project site packaging and debris cause by installation.

END OF SECTION

SECTION 102813 - TOILET ACCESSORIES

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- B. Provide and install toilet accessories and all other items as specified herein:
 - 1. Paper towel dispensers and combo paper towel dispenser with waste receptacle.
 - 2. Toilet paper dispensers.
 - 3. Toilet seat cover dispensers.
 - 4. Soap dispensers.
 - 5. Sanitary Napkin Vending and Disposal.
 - 6. Hand Sanitizer dispensers.
 - 7. Robe Hooks.
 - 8. Grab bars.
 - 9. Mirrors.
 - 10. Baby Changing Station.
 - 11. Shelf, Mop Rack and Utility Hooks.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 068200 - Fiberglass Reinforced Plastic Panels
- C. Section 079000 - Sealants and Caulking

- D. Section 092900 - Gypsum Board
- E. Section 099100 – Painting
- F. Section 123661 – Quartz Agglomerate Countertops
- G. Division 22 - Mechanical
- H. Division 26 - Electrical

1.3 SUBMITTALS

- A. Comply with provisions of Section 013300, Submittal Procedures.
- B. Submit for approval product data and accessory schedule, including manufacturer's full range of standard finish options and colors.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver, handle and store materials in accordance with manufacturer's instructions.

1.5 QUALITY ASSURANCE

- A. Comply with governing codes and regulations.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: ASI; Bobrick Washroom Equipment, Inc., Bradley Corporation, or approved equal.

2.2 MATERIALS

- A. Materials - General: Fabricate toilet accessory items from the following materials and according to requirements specified for individual accessory items.
 - 1. Stainless Steel: AISi Type 302/304, with polished No. 4 finish, 22 gauge minimum thickness, unless otherwise indicated.
 - 2. Sheet Steel: Cold-rolled, commercial quality ASTM A366, 20 gauge minimum thickness, unless otherwise indicated. Surface preparation and metal pretreatment as required for applied finish.
 - 3. Galvanized Steel Sheet: ASTM A527 G60.
 - 4. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B456, Type SC 2.

5. Galvanized Steel Mounting Devices: ASTM A153, hot-dip galvanized after fabrication.
6. Fasteners: Screws, bolts, and other devices of same material as accessory unit, or of galvanized steel where concealed.
7. Keys: Provide universal keys for access to toilet accessory units requiring internal access for servicing, resupply. Provide a minimum of 6 keys to the Owner.

2.3 ACCESSORIES

A. Provide the following accessories:

1. Paper Towel Dispenser, Surface Mounted: As manufactured by Bobrick, B-4262 or equal. 10-13/16 inch by 13-1/2 inch, 22 gauge SS with satin finish, all welded, to dispense C-fold or multifold paper towels.
2. Paper Towel Dispenser and Waste Receptacle, Recessed Mounted: As manufactured by Bobrick, B-4369 or equal. 12-3/4 inch by 28 inch, 22 gauge SS with satin finish, all welded, to dispense C-fold or multifold paper towels. Waste receptacle to be equipped with molded plastic trash liner, 3.0 gallon capacity.
3. Toilet Paper Dispenser, Partition Mounted: As manufactured by Bobrick, B-357 or equal. 30-5/86 inch by 17-3/16 inch, 18-8, type 304 heavy gauge SS with satin finish, combination toilet tissue/seat cover/sanitary disposal unit serving two compartments. Toilet tissue dispenser shall be high-impact ABS plastic. Sanitary disposal unit; self-closing panels shall be secured to cabinet with spring-loaded, full-length SS piano-hinges, with graphic symbol, include removable, leak-proof molded polyethylene receptacle with a capacity of 0.8 gal. TSC and SND serviced from one side only.
4. Toilet Paper Dispenser, Recessed Mounted: As manufactured by Bobrick, B-4388 or equal. 6-1/16 inch by 12-1/2", 22 gauge SS with satin finish, all welded, with flush tumbler lock key, semi-recessed multi-roll toilet tissue dispenser with two heavy-duty theft-resistant, molded ABS spindles.
5. Toilet Seat Cover Dispenser Surface Mounted: As manufactured by Bobrick, B-4221 or equal. 15-3/4 inches x 11-1/4 inches, 20 gauge SS with satin finish, one-piece seamless construction, rectangular opening for dispensing toilet seat covers, concealed bottom filled opening, single or half-fold paper toilet seat covers.
6. Soap Dispenser, Surface Mounted, vertical: As manufactured by Bobrick, B-2111 or equal. 4-3/4 inches by 8-1/8 inches, 22 gauge SS with satin finish,

one-piece seamless construction, concealed wall plate, clear acrylic refill indicator window, locked hinged top lid for filling, corrosion-resistant valve, antibacterial soap resistant plastic cylinder, 40-fl oz. liquid capacity. Valve shall be operable with one hand and with less than 5 pounds of force.

7. Soap Dispenser, Surface Mounted, horizontal: As manufactured by Bobrick, B-2112 or equal. 8-1/8 inches by 4-3/4 inches, 22 gauge SS with satin finish, one-piece seamless construction, concealed wall plate, clear acrylic refill indicator window, locked hinged top lid for filling, corrosion-resistant valve, antibacterial soap resistant plastic cylinder, 40-fl oz. liquid capacity. Valve shall be operable with one hand and with less than 5 pounds of force.
8. Soap Dispenser, Automatic Lavatory Mounted: As manufactured by Bobrick, B-826.18 or equal. Spout cover bright polished chrome plated plastic, meet barrier-free accessibility standards, with blinking LED indicator to show low soap level and low battery life, translucent and shatter-resistant polyethylene soap refill container with capacity of 54 fl. oz., water resistant motor assembly and battery pack holding 4 Alkaline "D" cell batteries.
9. Sanitary Napkin Dispenser, Semi-recessed Mounted: As manufactured by Bobrick, B-3706 or equal. 13-7/8 inches by 27-7/8 inches, 22 gauge SS with satin finish, one-piece seamless construction, concealed full-length SS piano-hinge cabinet door with graphic symbols identifying products dispensed and token denomination, coin and return-coin mechanisms of impact-resistant PC-ABS push buttons, unique coin box key equipped with tumbler lock, unique door locks, impact-resistant PC-ABS product tray.
10. Sanitary Napkin Disposal, Surface Mounted: As manufactured by Bobrick, B-270 or equal. 7-1/2 inches by 10 inches, 22 gauge SS with satin finish, all welded, container with integral finger depression for opening cover, cover secured to container with SS piano-hinge,
11. Hand Sanitizer Dispenser, Surface Mounted: As manufactured by Gojo Product, 6451-1W or equal. 12-1/64 inches by 8-1/16 inches by 9-3/32 inches, wall mounted ABS plastic dispenser holder with refillable PET plastic bottle dispenser, 1200 ml capacity, operates on 4 "C" batteries.
12. Robe Hooks: As manufactured by Bobrick, B-76717 or equal. 2 inches by 1-5/8 inches, 22 gauge SS with 18 gauge SS satin mounting bracket, all welded construction, secure wall plate with SS setscrew.
13. Grab Bars, Surface Mounted: As manufactured by Bobrick, B-6806 Series or equal. Concealed mounting flanges with two screw holes with SS snap flange cover, 1-1/2 inch outside diameter SS tubing, 18 gauge, 1-1/2 inch clearance between grab bar and wall, 8,000 psi M.O.R., 1,000 psi shear and pull out.

14. Mirrors: As manufactured by Bobrick, B-165 Series or equal. One piece interlock stainless steel mitered framed mirrors, 18 gauge frame, shock absorbing edge cushion, 22 gage steel back with integral hanging brackets, non-absorbent filler, float glass guaranteed against silver spoilage.
15. Baby Changing Station, Surface Mounted: As manufactured by Bobrick, KB110-SSWM or equal. 35-1/4 inches by 20 inches, 18 gauge SS with satin exterior finish, molded high-density grey polyethylene with antimicrobial interior, bed has reinforced full-length steel-on-steel hinge mechanism, molded-in graphics and safety messages in six languages, equipped with a pneumatic cylinder for controlled opening and closing of bed.
16. Shelf, Mop/Broom Holder and Hooks: As manufactured by Bobrick, B-239x34 or equal. 34 inches by 13 inches, 18 gauge SS with satin finish, all welded construction, hemmed front shelf edge, 16 gauge SS shelf support brackets weld to mounting base and shelf, rivet mounted 12 gauge SS rag hooks.
9. Under Sink ADA Pipe Insulation

B. Mounting Plates: Non-corrosive material. Provide as required.

2.4 FABRICATION

- A. General: Only a maximum 1-1/2 inch diameter, unobtrusive stamped manufacturer logo, as approved by the Architect, is permitted on exposed face of toilet or bath accessory units. On either interior surface not exposed to view or back surface, provide additional identification by either a printed, waterproof label or a stamped nameplate, indicating manufacturer's name and product model number.
- B. Surface-Mounted Toilet Accessories, General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.

3.0 EXECUTION

3.1 INSTALLATION

- A. General: Install assemblies in accordance manufacturer's printed instructions and approved submittals in proper relation with adjacent construction and with uniform appearance. Coordinate with Work of other Sections.
 1. Conceal evidence of drilling in partitions for mounting accessories.
 2. Restore damaged finishes and test for proper operation of each accessory. Clean and protect work from damage.

B. Paper Towel Dispenser:

1. Check Drawings and coordinate with Mechanical and Electrical Engineers to avoid protrusion from opposite wall, pipes, conduits, electrical wiring, etc.
2. Mount 66" from floor to top of unit for ADA compliance.
3. Provide framed wall opening; recessed depth required from finish face of wall is 4".
4. Provide filler, if necessary, to prevent a gap from finished wall and flange of unit.
5. Access to towels shall be 40" above finish floor to allow for forward and side reach.
6. Unit shall not project more than 1/4" from the wall.
7. Unit shall be operable with one hand and without tight grasping, pinching, or twisting of the wrist.

C. Toilet Tissue Dispenser:

1. Provide framed wall opening with recessed depth from finish face of wall 3-3/8". Coordinate with work of other trades to avoid protrusion from opposite wall, pipes, conduits, electrical wiring, etc.
2. Toilet tissue rolls should be mounted with forward edge no more than 36" from the back of wall of stall. Unit should be mounted 37" from finish floor to top of unit. All toilet tissue dispensers should be mounted with horizontal centerline of dispensing roll at least 19" above the finished floor.

D. Toilet Seat Cover Dispenser:

1. Check plans and coordinate with Mechanical and Electrical engineers to avoid protrusion from opposite wall, pipes, conduits, electrical wiring, etc.
2. If installing in plaster wall, recommend grounding. If installing where unit projects above top of wainscot, provide filler to prevent gap from finished wall and flange of unit. If installing in block walls, use metal expansion shields.

E. Soap Dispenser:

1. Mounting location for push button dispensers is 40" max from controls above the finish floor.

2. Push buttons and pistons should be operable with one hand and without tight grasping, pinching, or twisting of the wrist.
3. Activation of soap valves should not require more than 5 pounds of force when unit is completely filled.

F. Grab Bars:

1. Clearance shall be the distance between finished wall surface and the inner edge of the tubing.
2. Standard clearance furnished is 1-1/2".
3. The required mounting height is 33" from centerline of the grab bar to the finish floor.
4. Grab bars should be installed on back wall and 42" horizontal; grab bar installed side wall or partition stall.
5. Grab bars shall withstand 1300 lbs. of downward pull.

G. Mirror Units:

1. Bottom edge of reflective surface should be mounted no higher than 40" above the finish floor.
2. Unit shall be surface-mounted and shall install on a concealed wall hanger that locks into place. (Refer to wall instructions to locate mirror wall hangers.)
3. Secure unit to wall with 4 # 10 x 1-1/2" flat head full-threaded screws.
4. To remove unit from wall, see slide key instructions.

H. Soap Dispenser, Automatic Lavatory Mounted:

1. Check Drawings and coordinate with Electrical Engineers to avoid protrusion from opposite wall, pipes, conduits, electrical wiring, etc.

END OF SECTION

SECTION 104413 – FIRE EXTINGUISHER CABINETS

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install semi-recessed fire-rated fire extinguisher cabinets as shown on project Drawings.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 092900, Gypsum Board
- C. Section 104416, Fire Extinguishers

1.3 REFERENCES

- A. ASTM A366 - Commercial Steel (CS) Sheet, Carbon (0.15 Maximum Percent) Cold-Rolled.

1.4 SUBMITTALS

- A. Comply with provisions of Section 013300, Submittal Procedures.
- B. Product Data: Submit manufacturer's product data, including installation instructions.
- C. Test Reports: Submit test reports from Warnock Hersey for fire-rated cabinets.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage: Store materials indoors in a clean, dry area in accordance with manufacturer's instructions.
- C. Handling: Protect materials and finish from damage during handling and installation.

2.0 PRODUCTS

2.1 MANUFACTURER

- A. Larsen's Manufacturing Company, Minneapolis Division, 7421 Commerce Lane N.E., Minneapolis, MN 55432, Phone: (763) 571-1181, Toll Free: 1-800-527-7367 Fax: (763) 571-6900, www.larsenmfg.com or approved equal.

2.2 MATERIALS

- A. Fire-Rated Fire Extinguisher Cabinet: Architectural Series
 - 1. Configuration:
 - a. Non Rated: Model SS O-2409
 - 2. Conformance: ADA requirements.
 - 3. Cabinet Tub Size: 9 ½" x 24" x 6".
 - 4. Cabinet Type: recessed.
 - 5. Door Style: Occult style, clear tempered glass. Reinforced for flatness and rigidity. Latch access and handle.
 - 6. Materials:
 - a. Door Panel and Front: 18 gauge cold-rolled steel, ASTM A366.
 - b. Finish of Door Panel, Front, and Interior Tub: stainless steel

3.0 EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive cabinets. Notify Architect if areas are not acceptable. Do not begin installation until unacceptable conditions have been corrected.

3.2 PREPARATION

- A. Prepare rough openings using metal studs or double wood studs on all 4 sides of cabinet tub to be 1/4 inch larger than outside dimension of tub.
- B. Ensure load bearing header be reinstalled if load bearing stud is cut to install cabinet.

3.3 INSTALLATION

- A. Install cabinets in accordance with manufacturer's instructions at locations indicated on the drawings.
- B. Install cabinets plumb, level, square, and rigid without warp or rack.
- C. Secure cabinets to metal or wood studs using screws supplied by manufacturer.
- D. Use manufacturer's supplied hardware.

3.4 ADJUSTING

- A. Adjust doors and catches for smooth operation without binding.
- B. Inspect and adjust locks to operate properly.
- C. Touch-up marred finishes with manufacturer supplied paint.
- D. Replace defective or damaged doors, glazing, or other components as directed by Architect.

3.5 CLEANING

- A. Clean cabinets in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that would damage glazing or finish.

3.6 PROTECTION

- A. Protect cabinets and finish from damage during construction.

END OF SECTION

SECTION 104416 - FIRE EXTINGUISHERS

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Install City-furnished portable fire extinguishers where shown on project Drawings and as specified herein.

1.2 RELATED SECTIONS

- A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 104413, Fire Extinguisher Cabinets

1.4 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.5 SUBMITTALS

- A. Comply with provisions of Section 013300, Submittal Procedures.

2.0 PRODUCTS

2.1 MATERIALS

- A. Larsen's Manufacturing Company, MP Series – MP5 – dry chemical type, cast steel tank with pressure gauge, 5lb. nominal capacity.
 - 1. U/L Rating: 2-A:10-BC
- B. Larsen's Manufacturing Company, WC Series – WC-6L – wet chemical type, cast steel tank with pressure gauge, 6 liter nominal capacity.
 - 1. U/L Rating: 2-A:K

2.2 OTHER MATERIALS

- A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

3.0 EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install the work of this Section in strict accordance with the original design, pertinent requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved by the Architect.
- C. Anchor all components firmly into position for long life under hard use.

3.3 WARRANTY

- A. The product delivered shall be free from defects.
- B. Manufacturer's standard performance warranty, as available for specified installation and environmental conditions.

END OF SECTION

SECTION 105126 SOLID PLASTIC LOCKERS AND BENCHES

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install lockers as shown on the project Drawings.

1.2 RELATED SECTIONS

- A. Section 055000 - Metal Fabrications
- B. Section 061000 - Rough Carpentry
- C. Section 099565 - Epoxy Coatings
- D. Section 102113 - Toilet Compartments

1.3 REFERENCES

- A. UL – GREENGUARD certified low emitting materials.
- B. ASTM – B221 – Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire Profiles and Tubes.
- C. ASTM – A167 – Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
- D. National Fire Protection Association, 101 Life Safety Code 1991 Edition, Chapters 5, 6, 8-30.
- E. ANSI A117-1986 Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
- F. 2016 Title 24, California Code of Regulations, Parts 2, 3, and 5.
- G. ADA, Accessibility Guidelines for Buildings and Facilities, Federal Register Volume 56, Number 144, Rules and Regulations.

1.4 SUBMITTALS

- A. Comply with pertinent provisions of Volumes 1 and 2 of these Contract Documents.
- B. Submittals for Review:
 - 1. Shop Drawings: Include dimensioned layouts, elevations, trim, closures, accessories and anchorage. Show fabrication and erection of component assemblies to extent not fully described by manufacturer's data sheets.
 - 2. Product Data: Provide manufacturer's descriptive data, installation instructions, and replacement parts information.
 - 3. Samples: 3 x 3 inch samples showing full manufacturer's range.
- C. Sustainable Design Submittals:
 - 1. Recycled Content: Certify percentages of post-consumer and pre-consumer recycled content.
 - 2. Regional Materials: Certify distance between manufacturer and Project and between manufacturer and extraction or harvest point in miles.

1.5 QUALIFY ASSURANCE

- A. Lockers and benches shall be the products of a single manufacturer as specified herein.
- B. Manufacturer Qualifications: Minimum 10 years of experience in manufacture of solid plastic lockers and benches with products in satisfactory use under similar conditions.
- C. Installer Qualifications: Minimum 5 years of experience in work of this Section, certified installer through manufacturer's installation certification program.
- D. Indoor Environmental Quality Certification: Provide certificate indication that products have been certified under one of the following programs or a comparable certification acceptable to Owner.
 - 1. GREENGUARD Certification.
 - 2. GREENGUARD GOLD Certification.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, handle and store materials in accordance with manufacturer's instructions.

- B. Deliver items in manufacturer's original unopened protective packaging.
- C. Store materials in a clean, dry place.
- D. Handle in a manner to prevent damage to finished surfaces.
- E. HDPE materials to be tested per NFPA 286 (CBC 803.62)
- F. Protect plastic lockers and benches from exposure to direct sunlight.

1.7 WARRANTY

- A. Furnish manufacturer's written warranty covering all plastic components and plastic hardware against breakage, corrosion, and delamination, including panels, doors, and stiles for a period of 25 years.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Scranton Products, 801 Corey Street, Scranton, PA 18505, 1-800-445-5148, www.scrantonproducts.com, or approved equal.

2.2 MATERIALS - GENERAL

- A. Provide materials selected for surface flatness and smoothness.
- B. All exposed surfaces shall be free of saw marks. Exposed surfaces exhibiting defects, discolorations, and other imperfections are not acceptable.
- C. High Density Polyethylene: polyethylene thermoplastic formed into solid plastic components with homogeneous color throughout, with smooth orange peel finish.
- D. Heavy Duty Extruded Aluminum: B221, 6063-T6.
- E. Chromium Plated Steel: A167.
- F. Recycled Content: Minimum 25 percent.
- G. Color: To be selected from manufacturer's full color range.

2.3 STANDARD PLASTIC LOCKERS

- A. Locker Configuration: One tier.

- B. Locker Dimensions:
 - 1. Height: 72 inch.
 - 2. Width: 15 inch.
 - 3. Depth: 15 inch.

- C. Material: High density polyethylene (HDPE) plastic.

- D. Doors and Frames: 1/2 inch thick HDPE plastic.
 - 1. Door venting: Horizontal venting.
 - 2. Handle: ADA compliant ergonomic handle, injection molded plastic.
 - 3. Locks: Standard hasp
 - a. Location of Accessible lock shall be mounted at 48 inches maximum above finish floor.
 - 4. Hinge: Heavy duty extruded aluminum with corrosion free stainless steel pin with black finish.
 - 5. ADA Compliance: Provide 3134 aluminum, satin matte finish and adjustable 3/8 inch HDPE plastic shelf with plastic clips at accessible locations.
 - a. Location of Accessible shelving shall be between 15 inches and 48 inches above finish floor.
 - 6. Latch Bar: 3/8 inch thick HDPE plastic with multiple latch points, fastened with stainless steel resistant screws.

- E. Sides, Bottoms, Backs and Shelves: 3/8 inch thick HDPE plastic.
 - 1. Color: Same color as locker door.
 - 2. Finish: Same finish as locker door.

- F. Locker Tops: Flat top finished in same color as locker door.

- G. Assembly Profile: Full height of lockers, PVC plastic, snap fit assembled onto locker sides.

- H. Accessories:
 - 1. Coat hook: Two-prong, high impact plastic, mounted to bottom of shelf or divider, one per door.
 - 2. End Panels: 1/2 inch thick HDPE plastic, finished and color same color as locker

door.

3. Filler Panels and Trim: 1/2 inch thick HDPE plastic, finished and color same color as locker door.
4. Number Plate: 3134 aluminum, satin matte finish, fastened to locker with corrosion resistant stainless steel rivets.
5. Locker Base: 1 inch thick HDPE plastic, black color.
6. Wall hook: One per door opening.

2.4 LOCKER BENCHES

A. Bench Tops:

1. 1-1/2 inch thick HDPE.
2. Edge Treatment: Rounded to 1/4 inch radius.
3. Width: 20 inch.
4. Length: 54 inch.

B. Bench Back: One (1) bench in each restroom shall have back as indicated on Drawings.

1. 1-1/2 inch thick HDPE.
2. Edge Treatment: Rounded to 1/4 inch radius.
3. Width: As indicated on Drawings.
4. Length: Match bench top.

C. Pedestals: Secure to bench tops with stainless steel tamper resistant screws and secured to floor with lead expansion shields and 2 inch long stainless steel machine bolts.

1. Material: Aluminum.
2. Height: 16 inch.
3. Quantity: 4 per bench.

2.5 FABRICATION

- A. Fabricate locker and bench components square and rigid, finishes free from scratches and chips.
- B. Fabricate locker components for snap-together assembly or slide together dovetail connections providing solid and secure, anti-racking construction.
- C. Fabricate adjacent lockers with common side panel.
- D. Fabricate locker benches to sizes indicated in single lengths.

3.0 EXECUTION

3.1 INSTALLATION

- A. Install lockers in accordance with manufacturer's instruction and approved Shop Drawings.
- B. Set lockers on prepared locker base.
- C. Set plumb, rigid and aligned.
- D. Attach lockers to supporting construction with anchors best suited to substrate conditions.
- E. Attach locker benches to floor.

3.2 ADJUSTING AND CLEANING

- A. Adjust doors and latches to operate correctly.
- B. Clean exposed surfaces, hardware, interior surfaces and ensure finished work is left free of imperfections.
- C. Protect installation from on-going construction.

END OF SECTION

Division 11: Equipment

SECTION 115213 – PROJECTION SCREENS

1.0 GENERAL

1.1 SUMMARY

- A. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- B. Section Includes:
 - 1. Electrically operated projection screen.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 055000 - Metal Fabrications: Provision of metal backing.
- C. Section 095100 - Acoustical Ceilings: Provision of acoustical ceiling supports.
- D. Division 26 - Electrical: Provision of rough-in and connection to power.

1.3 REFERENCES

- A. FED STD - Federal Standard
 - 1. 191 A/5760 - Mildew Resistance of Textile Materials.
- B. FS - Federal Specifications
 - 1. GG-S-00172D(1): Screen, Projection
- C. NFPA - National Fire Protection Association
 - 1. 701 - Standard methods of Fire Tests for Flame-Resistant Textiles and Films.
- D. UL - Underwriters Laboratories, Inc.

1.4 DEFINITIONS

- A. Gain: Ratio of light reflected from or refracted by screen material to that reflected perpendicularly from a magnesium carbonate surface as determined per FS GG-S-00172D(1).
- B. Half-Gain Angle: The angle, measured from the axis of the screen surface, to the most central position on perpendicular plane through the horizontal centerline of the screen where the gain is half of the peak gain.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's product data.
- B. Shop Drawings: Submit shop drawings showing layout and types of projection of screens. Show the following:
 - 1. Location of screen centerline relative to ends of screen case.
 - 2. Location of wiring connections.
 - 3. Location of seams in viewing surfaces.
 - 4. Connections to suspension systems for pendant and recess-mounted screens.
 - 5. Anchorage details.
 - 6. Details of juncture of exposed surfaces with adjacent finishes.
 - 7. Frame details.
 - 8. Accessories.
 - 9. Wiring Diagrams: For electrically operated units.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer. Da-Lite, Claridge, or equal.

2.2 PROJECTION SCREEN, RECESSED CEILING

- A. Material and Viewing Surface of Front Projection Screen: Provide screen manufactured from mildew and flame resistant fabric of type indicated for screen specified and complying with the following requirements:

1. Matte white viewing surface with gain characteristics complying with FS GG- S-00172D(1) for Type A screen surface.
 2. Mildew Resistance: Provide mildew resistant screen fabrics as determined by Fed Std 191 A/5760.
 3. Fire Performance Characteristics: Provide projection screen fabric identical to materials that have been tested for flame resistance according to both small and large scale tests of NFPA 701.
 4. Seams: Where length of screen indicated exceeds maximum length produced without seams in fabric specified, provide screen with horizontal seam placed at bottom of screen at juncture between extra drop length and viewing surface.
 5. Edge Treatment: Black masking borders.
 6. Size of Viewing Surface:
 - a. Electric Operate Screen: 96 inches wide by 60 inches high image size.
 - b. Manually Operated Screen: 72 inches wide by 48 inches high.
 7. Extra Drop: Provide 10 feet-0 inches wide by 4 feet-0 inches at top of screen, in black color.
- B. Electrically Operated Screens with Automatic Ceiling Closure: Units designed and fabricated for recessed installation in ceiling with bottom of case composed of 2 panels fully enclosing screen, motor, and wiring; 1 panel hinged and designed to open and close automatically when screen is lowered and fully raised, and the other panel removable or operable for access to interior of case; and complying with the following requirements:
1. Multistation Control: Low-voltage control system consisting of a control unit with 24-V power supply and remote, 3-button or 3-position switches at locations indicated with metal device boxes and cover plates for flush wall mounting.
 - a. Provide locking cover plates for switches.
 - b. Provide infrared remote control consisting of battery-powered transmitter and receiver for use with low-voltage control system.
 2. Screen Case with Motor in Roller. Aluminum framing with side, end, and top panels of fire-retardant hardboard or ABS plastic and with aluminum

bottom panels, factory primed and constructed as follows:

- a. Offset mount bottom panels so their bottom surface will align flush with adjoining ceiling and the bottom edges of case sides and ends will be recessed behind ceiling finish.
3. Product: Da-Lite's "Boardroom Electrol", or equal.
- C. Electrically Operated Screens with Automatic Ceiling Closure: Units designed and fabricated for recessed installation in ceiling with bottom of case composed of 2 panels fully enclosing screen, motor, and wiring; 1 panel hinged and designed to open and close automatically when screen is lowered and fully raised, and the other panel removable or openable for access to interior of case; and complying with the following requirements:
1. Screen Case with Motor in Roller: Aluminum framing with side, end, and top panels of fire-retardant hardboard or ABS plastic and with aluminum bottom panels, factory primed and constructed as follows:
 - a. Offset mount bottom panels so their bottom surface will align flush with adjoining ceiling and the bottom edges of case sides and ends will be recessed behind ceiling finish.
 2. Product: Da-Lite's "Boardroom Electrol", or equal.

3.0 EXECUTION

3.1 INSTALLATION

- A. General: Install projection screens at locations indicated to comply with screen manufacturer's written instructions.
- B. Install front projection screens with screen cases in position and relationship to adjoining construction indicated. Securely anchor to supporting substrate in a manner that produces a smoothly operating screen with vertical edges plumb and viewing surface flat when screen is lowered.
 1. Test electrically operated units to verify that screen, controls, limit switches, closure, and other operating components are in optimum functioning condition.

3.2 PROTECTING AND CLEAN UP

- A. Protect projection screens after installation from damage during construction. If damage occurs despite such protection, remove and replace damaged components or entire unit as required to provide units in their original, undamaged condition.

END OF SECTION

**Division 13:
Special
Facilities**

SECTION 133419 – METAL BUILDING SYSTEMS

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. This Section establishes general requirements for a metal building system to be installed on the Project site using prefabricated components. All costs of transportation to and installation at the site are included.
 - 1. Metal building system includes:
 - a. Structural-steel framing.
 - b. Metal roof panels.
 - c. Metal wall panels.
 - d. Thermal insulation at exterior walls.
 - e. Doors and windows at the exterior walls.
 - f. Glazing at doors and windows at exterior walls.
 - g. Metal canopy structure.
 - h. Finishes as called out on Drawings.
 - i. Accessories and trims as part of metal building system.
- D. Related Sections:
 - 1. Division 3 Sections for cast-in-place concrete, reinforcing and formwork installed in a metal building system.
 - 2. Division 7 Sections for concrete waterproofing, vapor retarder and barriers installed in a metal building system.
 - 3. Division 8 Sections for door and entrance hardware installed in metal building system.
 - 4. Division 22 Sections for plumbing systems installed in metal building system.

5. Division 23 Sections for mechanical systems installed in metal building system.
6. Division 26 Sections for Electrical systems installed in metal building system.
7. Division 32 Sections for underground site utility lines connected to metal building system.
8. Other Sections as reference elsewhere in this Section for requirements applicable to other products and materials to be installed in metal building system.

1.2 REFERENCES

- A. American Institute of Steel Construction (AISC):
 1. AISC Specification for Structural Steel Buildings.
 2. AISC Serviceability Design Considerations for Low-Rise Buildings
- B. American Iron and Steel Institute (AISI):
 1. AISI North American Specification for the Design of Cold-Formed Steel Structural Members
- C. American Welding Society (AWS):
 1. AWS D1.1 / D1.1M – Structural Welding Code – Steel.
 2. AWS D1.3 / D1.3M – Structural Welding Code – Sheet Steel
- D. Association for Iron & Steel Technology (AISE):
 1. AISE 13 – Specifications for Design and Construction of Mill Buildings.
- E. ASTM International (ASTM):
 1. ASTM A 36 – Standard Specification for Carbon Structural Steel
 2. ASTM A 48 – Specification for Gray Iron Castings
 3. ASTM A 123 – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

ASTM A 194 – Specification for Carbon Steel, Alloy Steel, and Stainless Steel Nuts
ASTM A 307 – Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength

4. ASTM A 354 – Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners

ASTM A449 – Standard Specification for Hex Cap Screws, Bolts and Studs, Steel, Heat Treated, 120/105/90 ksi Minimum Tensile Strength, General Use
5. ASTM A 475 – Specification for Zinc-Coated Steel Wire Strand
6. ASTM A 500 – Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
7. ASTM A 529 – Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.

ASTM A536 Standard Specification for Ductile Iron Castings
8. ASTM A 563 – Specification for Carbon and Alloy Steel Nuts

ASTM A568 Standard Specification for Steel, Sheet, Carbon, Structural, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for
9. ASTM A 572 – Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

ASTM A635 – Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Alloy, Carbon, Structural, High-Strength Low-Alloy, and High-Strength Low Alloy with Improved Formability, General Requirements for
10. ASTM A 653 / A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

ASTM A673 – Standard Specification for Sampling Procedure for Impact Testing of Structural Steel

ASTM A755 – Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products
11. ASTM A 792 / A 792M – Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process

ASTM A924 – Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process

12. ASTM A 992 – Standard Specification for Structural Steel Shapes.
13. ASTM A 1011 – 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.

ASTM A1018 – Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Carbon, Commercial, Drawing, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
14. ASTM A 1039 – Specification for Steel, Sheet, Hot Rolled, Carbon, Commercial, Structural, and High-Strength Low-Alloy, Produced by Twin-Roll Casting Process

ASTM A1063 – Standard Specification for Steel Sheet, Twin-Roll Cast, Zinc-Coated (Galvanized) by the Hot-Dip Process

ASTM B633 – Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
15. ASTM E 96 / E 96M – Standard Test Methods for Water Vapor Transmission of Materials.
16. ASTM E 108—Spread-of Flame Testing: Class 1A Rating.
17. ASTM E 283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
18. ASTM E 331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
19. ASTM E 1592 – Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
20. ASTM E 1646 – Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference
21. ASTM E 1680 – Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems
22. ASTM E 2140 – Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head

23. ASTM F 436 – Specification for Hardened Steel Washers
ASTM F 844 – Standard Specification for Washers, Steel, Plain (Flat), Unhardened for General Use
 24. ASTM F 1145 – Standard Specification for Turnbuckles, Swaged, Welded, Forged
 25. ASTM F 1554 – Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
 26. ASTM F 3125 – Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength. (replaces A325 & A490)
- F. CSA – Canadian Standards Association
- G. CWB – Canadian Welding Bureau
- H. IAS – International Accreditation Service
- I. LGSI – Light Gauge Steel Institute
- J. SJI – Steel Joist Institute
- K. Florida Product Approval:
1. American Buildings Company Roof Deck approved under file number FL704, FL7709 & FL6961
 2. American Buildings Company Metal Roofing approved under file number FL 4813
 3. American Buildings Company Siding approved under file number FL 705
- L. Factory Mutual Approvals (FM Approvals):
1. FMRC Standard 4471 – Approval Standard for Class 1 Roofs for Hail Damage Resistance, Combustibility, and Wind Uplift Resistance.
 2. FM 4881 – Approval Standard for Class 1 Exterior Wall Systems.
- M. FM Global:
1. FM 1-28 – Property Loss Prevention Data Sheet 1-28, Wind Design, October 2015.

- N. Metal Building Manufacturers Association (MBMA):
 - 1. MBMA Metal Building Systems Manual, latest edition.
- O. Underwriters Laboratories (UL):
 - 1. UL-580 – Standard for Tests for Uplift Resistance of Roof Assemblies.
 - 2. UL-790 – Standard Test Methods for Fire Tests of Roof Coverings.
 - 3. UL-2218 – Impact Resistance of Prepared Roof Covering Materials.

1.3 DEFINITIONS

- A. Terminology Standard: See MBMA’s “Metal Building Systems Manual” for definitions of terms for metal building system construction not otherwise defined in this Section or in standards referenced by this Section.

1.4 COORDINATION

- A. Coordinate sizes and locations of concrete foundations and casings of anchor rods and other inserts into foundation wall and footings. Anchor rod installation, concrete, reinforcement, and formwork requirements are specified in Division 3 Specifications sections.
- B. Coordinate metal panel assemblies with rain drainage work, flashing, trim and construction supports and other adjoining work to provide a leak-proof, secure, and noncorrosive installation.

1.5 PREINSTALLATION MEETING

- A. Pre-Installation/Erection Meeting: Conduct meeting at Project site.
 - 1. Review methods and procedure related to metal building system, including but not limited to, the following:
 - a. Condition of foundations and other preparatory work.
 - b. Structural load limitations.
 - c. Construction schedule; verify availability of materials, erector’s personnel, equipment, and facilities needed to make progress and impact on construction schedule.
 - d. Required tests, inspections, and certifications.

- e. Unfavorable weather and forecasted weather conditions and impact on construction schedule.
2. Review methods and procedures related to metal roof panel assemblies including, but not limited to, the following:
 - a. Compliance with requirements for purlin and rafter conditions, including flatness and attachment to structural members.
 - b. Structural limitations of purlins and rafters during and after roofing.
 - c. Flashings, special roof details, roof drainage, roof penetrations, equipment curbs, and conditions of other construction that will affect metal roof panels.
 - d. Temporary protection requirements for metal roof panel assembly during and after installation.
 - e. Roof observation and repair after metal roof panel installation.
 3. Review methods and procedures related to metal wall panel assemblies including, but not limited to, the following:
 - a. Compliance with requirements for support conditions, including alignment between and attachment to structural members.
 - b. Structural limitations of girts and columns during and after wall panel installation.
 - c. Flashings, special siding details, wall penetrations, openings, and conditions of other construction that will affect metal wall panels.

1.6 ACTION SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of the following metal building system components:
 1. Insulation.
 2. Metal roof panel system.
 3. Metal wall panel system.
 4. Door and window system.

- B. Shop Drawings: Include plans, elevations, sections, and details of metal building system. Indicate components by other than metal building system manufacturer.
1. Shop Drawings to be signed and sealed by the qualified licensed architect and professional engineers responsible for their preparation.
 - a. Coordinate and obtain approval and required permits from Authority Having Jurisdiction prior to start of fabrication.
 - b. Include structural analysis data indicating compliance with performance requirements signed and sealed by the qualified professional engineer responsible for their preparation.
 2. Anchor-Rod Plans: Submit anchor-rod plans before foundation work begins. Include location, diameter, projection of anchor rods required to attach manufactured building to foundation. Indicate column reactions at each location.
 3. Structural Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.
 4. Metal Roof and Wall Panel Layout Drawings: Show layouts of panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, clip spacing, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.
 - a. Show roof-mounted items including roof hatches, equipment supports, pipe supports and penetrations, lighting fixtures, and items mounted on roof curbs.
 - b. Show wall-mounted items including personnel doors, windows, louvers, and lighting fixtures.
- C. Energy Calculations: Signed and sealed by qualified professional engineer; showing compliance with referenced codes for the following:
1. Building envelope.
- D. Samples for Initial Selection: For each type of metal building system component with factory-applied color finish, submit manufacturer's full range of colors for selection by Architect.

- E. Samples for Verification: For each type of exposed finish required, prepared on Sample of sizes indicated below:
1. Panels: Nominal 12 inches long by actual panel width. Include fasteners, closures, and other exposed panel accessories.
 2. Flashing and Trim: Nominal 12 inches long. Include fasteners, and other exposed accessories.
 3. Vapor-Retarder Facings: Nominal 6 inch square samples.
 4. Accessories: Nominal 12 inch long samples for each type of accessory.

1.7 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For erector.
- B. Welding Certificates.
- C. Letter of Design Certification: Signed and sealed by the qualified professional engineer responsible for design of metal building system. Include the following:
1. Name and location of Project.
 2. Order Number.
 3. Name of manufacturer.
 4. Name of Contractor.
 5. Building dimensions including width, length, height, and roof slope.
 6. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
 7. Governing building code and year of edition.
 8. Design Loads: Include specified designed loads.
 - a. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing codes.
 9. Building-Use Category: Indicate category of building use and its effect on load importance factors.

- D. Erector Certificate: Signed by metal building system manufacturer certifying that erector complies with requirements.
- E. material Test Reports: For each of the following products:
 - 1. Structural steel including chemical and physical properties.
 - 2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 3. Tension-control, high-strength, bolt-nut-washer assemblies.
 - 4. Shop primers.
 - 5. Nonshrink grout.
- F. Sample Warranties: For special warranties.

1.8 CLOSEOUT MATERIALS

- A. Maintenance Data: For metal panel finishes, to include in maintenance manuals.

1.9 QUALITY ASSURANCE

- A. Metal Building System Manufacturer: Primary products furnished by single IAS AC472 accredited manufacturer/fabricator with minimum 5 years of experience, as well as demonstrated ability to obtain approval from Authority Having Jurisdiction.
- B. Erector Qualifications:
 - 1. Single installer with minimum 5 years of experience in installing products of same or similar type and scope.
 - 2. Installer must be certified by the metal building manufacturer.
- C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or providing product that is similar to those indicated for this Project in material, design, and extent.
- D. Welding Qualifications:
 - 1. AWS D1.1, "Structural Welding Code – Steel."
 - 2. AWS D1.3, "Structural Welding Code – Sheet Steel."

- E. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:
 - 1. Store and handle materials in accordance with manufacturer's instructions.
 - 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
 - 3. Do not store materials directly on ground.
 - 4. Store materials on flat, level surface, raised above ground, with adequate support to prevent sagging.
 - 5. Protect materials and finish during storage, handling, and installation to prevent damage.
- C. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- D. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

1.11 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when weather conditions permit metal building system to be installed according to manufacturer's written instructions and warranty requirements.

1.12 WARRANTY

- A. Special Weather Tightness Warranty for Metal Roof Panels: Manufacturer agrees to repair or replace roof panel assemblies that leak or otherwise fail to remain weathertight within specified warranty period.
 - 1. Warranty Period: 20 years.
- B. Special Warranty on Metal Panel Finishes: Manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Includes color fading according to ASTM D 2244, chalking according to ASTM D 4214, cracking, checking, peeling or failure of paint to adhere to bare metal.
2. Warranty Period: 20 years from date of Substantial Completion.

2.0 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide metal building system by one of the following:
1. American Standard Steel Building Systems,
<http://www.americanstandardbuildings.net>
 2. Olympia Steel Buildings, Toll-free 1-888-449-7756,
www.Olympiabuildings.com
 3. Garco Building Systems, Toll Free: 888.685.9768, www.garcobuildings.com
 4. or approved equal.

2.2 CALGREEN REQUIREMENTS

- A. General: Conform to all applicable requirements of the California Green Building Standards Code (CAL Green) including sealants, sealant primers, adhesives, adhesive primers, paints and coatings.

2.3 PERFORMANCE REQUIREMENTS

- A. General: Provide a complete, integrated set of mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement and exposure to weather without failure, corrosion or infiltration of water into building interior.
1. Delegated Design: Engage qualified professional engineer to design metal building system, including comprehensive engineering analysis using performance requirements and design criteria indicated.
 2. System Description:
 - a. Structural System:
 - i) Primary Frame: Rigid clear span, solid-member structural framing system.

- ii) Secondary Frame: Manufacturer's standard purlins, joists and girts.
 - b. Roof System: Manufacturer's standard lap-seam tapered-rib metal roof panels.
 - c. Exterior Wall System: Metal wall panels as follows:
 - i) Exposed-fastener, lap-seam metal wall panels.
- B. Regulatory Requirements: Design and engineer prefabricated building system to be in conformance with all applicable codes, ordinances, and other regulations, including the following:
 - 1. California Building Code (CCR, Title 24, Part 2).
 - 2. California Energy Code (CCR, Title 24, Part 6).
- C. Structural Loads: Provide metal building system capable of withstanding the effects of the following:
 - 1. Vertical Loads: Live Load (Uniform) at Roof; 20 psf, and concentrated load 300 lbs.
 - 2. Wind loads and stresses calculated based on requirements of California Building Code, using factors defined therein and applicable to local site conditions and specific project parameters.
 - a. Wind Speed (Ultimate Design Wind Speed V_{ult}): 115 mph.
 - b. Include wind uplift effects in calculations.
 - 3. Seismic Loads: Earthquake motions determined according to requirements of the California Building Code and Seismic Design Category specific to project.
- D. Accessibility Requirements: Comply with applicable provisions of the following:
 - 1. California Building Code (CCR, Title 24, Part 2), Chapters 11A and 11B.
 - 2. United States Department of Justice's 2010 ADA Standards for Accessible Design.
- E. Energy Performance: Design and engineer metal building system to conform to all applicable requirements of the California Energy Code.

2.4 STRUCTURAL-STEEL FRAMING

- A. Structural Steel: Comply with AISC 360, “Specification for Structural Steel Buildings”.
- B. Bolted Connections: Comply with RCSC “Specification for Structural Joints Using High-Strength Bolts”.
- C. Cold-Formed Steel: Comply with AISC “North American Specification for the Design of Cold-Formed Steel Structural Members” for design requirement and allowable stresses.
- D. Primary Framing: Manufacturer’s standard primary-framing system, designed to withstand specified loads and meet specified requirements. Primary framing includes transverse and lean-to frames; rafters, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.
- E. Secondary Framing: Manufacturer’s standard secondary-framing system, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed structural-steel sheet or roll-formed metallic-coated steel sheet, prepainted with coil coating.

2.5 METAL ROOF PANELS

- A. Exposed-Fastener, Tapered-Rib, Metal Roof Panels: Formed with raised seamed ribs and intermediate stiffening ribs symmetrically spaced between major ribs; designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.
 - 1. Product: based on the following:
 - a. American Standard Steel Building Systems, Double-Lok.
 - b. or approved equal.
 - 2. Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet. Prepainted by the coil coating process to comply with ASTM A 755.
 - a. Exterior Finish: Two-coat fluropolymer.
 - b. Thickness: As required to meet specified performance requirements for structural loading.
 - c. Colors: As selected by Architect from manufacturer’s standard range.
 - 3. Intermediate Stiffening Rib Spacing: 8 inches on center.

4. Panel Coverage: 24 inches.
5. Panel Height: 3 inches.

2.6 METAL WALL PANELS

- A. Metal Wall Panel: Factory-formed metal wall panels designed to be field-assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.
 1. Product: based on the following:
 - a. American Standard Steel Building Systems, PBR.
 - b. or approved equal.
 2. Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet. Prepainted by the coil coating process to comply with ASTM A 755.
 - a. Exposed Surface Texture: Smooth.
 - b. Finish:
 - i) Exposed (Weather) Side: Two-coat fluropolymer.
 - a) Color: As indicated on Drawings.
 - ii) Back Side: Manufacturer's standard siliconized polyester.
 - a) Color: As selected by Architect from manufacturer's standard range.
 - c. Thickness: As required to meet specified performance requirements for structural loading, 24 gauge minimum.
 3. Panel Orientation: Vertical.
 4. Panel Profile: Corrugated alternating hat ribs spaced at 12 inches on center with intermediate stiffening ribs 4 inches on center.
 5. Panel Coverage: 36 inches.
 6. Panel Height: 1-1/4 inch.
 7. Attachment: Direct attachment.

2.7 THERMAL INSULATION

- A. Faced Metal Building Insulation: AST C 991, Type II, glass-fiber blanket insulation; 05-lb/cu ft. density; 2-inch wide continuous, vapor-tight edge tables; with a flame-spread index of 25 or less.
- B. Retainer Strips: For securing insulation between supports, 0.025-inch nominal thickness, formed metallic-coated steel or PVC retainer clips colored to match insulation facing.

2.8 THERMAL AND MOISTURE PROTECTION

- A. Refer to Section 072600 – Surface Applied Vapor Retarder for requirements.

2.9 OPENINGS

- A. Refer to Section 081100 – Metal Doors, Windows and Frames for requirements.
- B. Refer to Section 088100 – Glass and Glazing for requirements.

2.10 FINISHES

- A. Refer to Sections 2.5 and 2.6, and Drawings for requirements.

2.11 ACCESSORIES

- A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory, to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
- B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, filler, closure strips and similar items. Match material and finish of metal roof panels unless otherwise indicated.
- C. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, sealants, gaskets, filler, closure strips and similar items. Match material and finish of metal wall panels unless otherwise indicated.
- D. Flashing and Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch (26 gauge) nominal uncoated steel thickness, prepainted with coil coating; finished to match adjacent metal panels.
- E. Gutters: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch (26 gauge) nominal uncoated steel thickness, prepainted with coil coating; finished to match adjacent metal panels. Match profile of gable trim,

complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch long sections, sized according to SMACNA's "Architectural Sheet Metal Manual".

- F. Downspouts: Steel Pipe: ASTM A 53, standard weight (Schedule 40); hot-dip galvanized per ASTM A 123.
- G. Roof Curbs: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.048-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match metal roof panels; with welded top box and bottom skirt, and integral full-length cricket; capable of withstanding loads of size and height indicated.
- H. Pipe Flashing: Pre-molded, EPDM pipe collar with flexible aluminum ring bonded to base.

2.12 FABRICATION

- A. General: Design components and field connections required for erection to permit easy assembly.
 - 1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
 - 2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape and location. Members shall be free of cracks, tears, and ruptures.
- B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.
- C. Primary Framing: Shop fabricate framing components to indicated size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.
 - 1. Make shop connections by welding or by using high strength bolts.
 - 2. Join flanges to webs of built-up members by a continuous, submerged arc-welding process.
 - 3. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin web or girt web, so flange compressive strength is within allowable limits for any combination of loadings.

4. Weld clips to frames for attaching secondary framing if applicable, or punch for bolts.
 5. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary framing with specified primer after fabrication.
- D. Secondary Framing:
1. Make shop connections by welding or by using non-high-strength bolts.
 2. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary framing with specified primer after fabrication.
- E. Metal Panels: Fabricate and finish metal panels at the factory, to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

2.13 SOURCE QUALITY CONTROL

- A. In-Plant Inspection: In-plant inspection services and reports will be provided by an independent inspector retained by County. In-Plant Inspector will verify that metal building manufacturer maintains detailed fabrication and quality-control procedures, and shall have full access to all manufacturing plant operations involving work of this Project.
1. In-Plant Inspector to be notified at least 5 working days prior to commencement of production of building.
 2. In-Plant Inspector to be notified in advance of those operations requiring observation.
 3. Obtain written release from In-Plant Inspector before metal building system components are removed from manufacturing plant for delivery to Project site.
- B. Correct deficiencies in the Work that Inspector's reports indicate do not comply with specified requirements.

3.0 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with erector present, for compliance with requirements and metal building system manufacturer's tolerances.
 - 1. Engage land surveyor to perform surveying.
- C. Proceed with delivery and erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and prepare surfaces thoroughly prior to installation.
- B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads equal in intensity to design loads. Remove temporary supports when permanent structural framing connections and bracing are in place, unless otherwise indicated.

3.2 PREPARATION

- A. The erection of the metal building and the installation of accessories shall be performed in accordance with the metal building manufacturer's erection manuals and the building erection drawings. The erection shall be performed by a qualified erector using proper tools and equipment. In addition, erection practices shall conform to Section 4, Common Industry Practices found in the most current version of the Metal Building Systems Manual. There shall be no field modifications to primary structural members except as authorized and specified by manufacturer.

3.3 THERMAL INSULATION INSTALLATION

- A. General: Install insulation concurrently with metal panel installation, in thickness indicated to cover entire surface according to manufacturer's instructions.
 - 1. Set vapor-retarder-faced units with vapor retarder toward warm side of construction unless otherwise indicated. Do not obstruct ventilation spaces except for firestopping.
 - 2. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to the surrounding construction to ensure airtight installation.

- B. Blanket Roof Insulation: Cover entire surface and install according to manufacturer's instructions. Install retainer strips straight and taut, nesting with secondary framing to hold insulation in place.
- C. Blanket Wall Insulation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Hold in place by metal wall panels fastened to secondary framing. Install retainer strips straight and taut, nesting with secondary framing to hold insulation in place.

3.4 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: County will engage a qualified testing and inspecting agency to perform field quality control inspections and submit reports.
- B. Correct deficiencies in Work that test and inspection reports indicate do not comply with specified requirements.
 - 1. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

3.6 CLEANING

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- C. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing and accessories.
 - 1. Clean and prepare surfaces by SSPC-SP 2 "Hand Tool Cleaning" or by SSPC-SP3, "Power Tool Cleaning".
 - 2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
- D. Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished

surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

**Division 22:
Plumbing**

SECTION 22 00 00 - PLUMBING

1.0 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 ANCILLARY GENERAL CONDITIONS

- A. The following shall be ancillary to the General and Supplementary Conditions and Division 1 Specification Sections:
 - 1. Prior to bidding the project, thoroughly examine all construction documents and specifications, survey the existing site conditions, and include all necessary allowances in bid proposal.
 - 2. In case of a discrepancy in the specifications, between the specifications and the drawings, within the drawings, or between work under this section and other sections, the Contractor shall figure the most stringent and most expensive alternate and, after award of contract, secure direction from the Owner's Representative.

1.3 DESCRIPTION OF WORK

- A. The Contractor shall furnish all labor, materials, testing, tools, equipment, services, and transportation necessary for the completion of all plumbing work as indicated on the drawings and specifications herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner. Work includes, but not limited to the following:
 - 1. Plumbing Fixtures.
 - 2. Soil, waste, and vent piping system including connections to equipment furnished in another section of work, stub-outs, and connections to exterior stub-outs.
 - 3. Storm drainage piping system including roof drains, overflow drains, area drains, insulation of horizontal lines and connections to stub-outs.
 - 4. Indirect waste piping including insulation and connections to equipment furnished in another section of work.
 - 5. Condensate drain piping system including insulation and connections to equipment furnished in another section of work.

6. Domestic hot and cold-water piping systems including water heaters, mixing valves, circulating pumps, pipe insulation, connections to equipment furnished in another section of work, and connections to exterior stub-outs.
7. Natural gas piping system including regulators, connections to equipment furnished in another section of work, and service connections.
8. Hangers, anchors, sleeves, metal supports, and channels as required for work under this section including sound isolators where indicated.
9. Piping and valve identification.
10. Furnishing and installation of plumbing fixtures and trim.
11. Final piping connections to all fixtures, equipment, including equipment furnished under other sections.
12. Miscellaneous steel work including floor sleeves, slots, inserts, plates, supports, hangers, etc.
13. Testing, adjusting of completed work, inspections, and instructions.
14. Repair of damage done to premises as a result of this installation and removal of all debris left by those engaged in this installation.
15. Shop drawing, submittals, as-built drawings and operation and maintenance manuals.
16. Permits and connection fees.
17. Flashing and counter flashing.
18. All rigging hoisting, transportation and associated work necessary for placement of all equipment in the final location shown.
19. Concrete coring, cutting and patching as a of this work.
20. Trenching, and compacting for work under this section.
21. Painting of exposed piping and supports in accordance with Section 09 91 00, Painting.

1.4 RELATED WORK ELSEWHERE

- A. Section 07 84 13, Fire Stopping.
- B. Section 07 92 00, Sealants.
- C. Section 08 31 13, Access Panels.

- D. Section 09 91 00, Painting.
- E. Section 21 00 00, Fire Protection.
- F. Division 26, Electrical.

1.5 REFERENCE AND STANDARDS

- A. Regulatory compliance: All work performed under this Division shall comply with the latest currently adopted editions of all codes and regulations and all requirements of all Authorities Having Jurisdiction. The following references and standards are hereby made a part of this Section and work shall conform to applicable requirements herein except as otherwise specified herein or shown on the Drawings.
- B. Codes and Standards: Conform to all applicable codes and standards as stated herein and as described in Division 1 of the Specifications, including the following:
 - 1. American Gas Association (AGA)
 - 2. American National Standards Institute (ANSI)
 - 3. Adhesive and Sealant Council (ASC)
 - 4. American Society of Mechanical Engineers (ASME)
 - 5. American Society for Testing and Materials (ASTM)
 - 6. American Society of Civil Engineers (ASCE)
 - 7. California Building Code (CBC)
 - 8. California Plumbing Code (CPC)
 - 9. California Fire Code (CFC)
 - 10. California Energy Conservation Code, Title 24
 - 11. State of California Administrative Code (CAC) Titles 8, 17, and 24
 - 12. California Electric Code (CEC)
 - 13. National Electrical Manufacturers Association (NEMA)
 - 14. National Fire Protection Agency (NFPA)
 - 15. Underwriters' Laboratories (UL)
 - 16. Comply with all ADA and California Title 24 requirements for disabled access.

17. City Fire Marshal requirements
 18. Comply with the latest edition of all applicable standards, including AWWA, PDI, and OSHA
- C. Minimum requirements: The requirements of these are the minimum that will be allowed unless such requirements are exceeded by applicable codes or regulations, in which the regulatory codes or regulation requirements shall govern.
- D. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted Authorities Having Jurisdiction and from the Owner's Representative.

1.6 WORK RESPONSIBILITIES

A. Site Conditions:

1. Examine all of the drawings and the specifications and survey the existing site conditions.
2. Resolve all conflicts with code requirements, site conditions, the work of other trades, or other mechanical contractors.
3. Verify the location of all existing utilities prior to construction and protect from damage.
4. Pay all costs incurred due to damage of existing utilities or other facilities.

B. Drawings:

1. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of their work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.
2. The general intent of the design indicated on the drawings shall be followed as closely as possible. Coordinate with architectural, structural, mechanical and electrical drawings and the work of other trades prior to piping and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Owner's Representative for approval. Only when Owner Representative's approval is given, in writing, shall Contractor proceed with installation of the work.
3. Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions

as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the Owner's Representative may permit the installation to remain. However, all costs incurred to revise the contract drawings by the Engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

4. Bring discrepancies between different drawings, between drawings and actual field conditions or between drawings and specifications, promptly to the attention of the Owner's Representative for decision.
5. Install pipe with all necessary offsets and to conform to the structure. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, maintain required accessibility, keep openings and passages clear, and satisfy the requirements of the governing codes and standards of good practice. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.
6. Clearances and Openings: Contractor shall cooperate and coordinate their work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to their requirements for equipment and installation of any kind, regardless if specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.
7. Contractor shall and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.
8. The architectural drawings and specifications take precedence over the plumbing drawings for location of casework, equipment, lights, diffuser, plumbing fixtures, etc. Contractor shall refer to the drawings, specifications, and review shop drawings for all work, in order to coordinate their work with the other work of the project.
9. All scaled and figured dimensions are approximate and are given for estimate purposes only. Before proceeding with any work, carefully check and verify all dimensions, sizes, etc.

10. Drawings are diagrammatic and size and locations of equipment are generally shown to scale. Make use of data in all Contract Documents, and informational documents, and verify this information against field conditions.
11. As far as possible, the work has been indicated on the drawings in such positions as to suit and accommodate the work of the other trades, but the work as indicated is largely diagrammatic and is shown primarily for clarity. Contractor is responsible for the correct placing of their work and the proper location and connection of their work in relation to the work of other trades.
12. Where apparatus and equipment have been indicated on the drawings, dimensions have been from typical equipment of the class indicated. Carefully check the drawings to see that the equipment will fit into the spaces provided.
13. Where equipment is furnished by another Division or others, verify dimensions and the correct locations of this equipment before proceeding with the rough-in of connections.

C. Responsibility:

1. Be responsible for any cooperative work must be altered due to lack of proper supervision or failure to make proper provision in time. Such changes shall be directly supervised by the Owner's Representative and shall be made to their satisfaction.
2. Provide complete functioning systems and include all labor, materials and associated tools and transportation required for the system to operate safely and satisfactorily.
3. Provide all work indicated on the drawings regardless if mentioned in the specifications.
4. Coordinate the installation of plumbing items with the schedules for work of other trades and other contractors to prevent delays in total work. Assume responsibility for any cooperative work which must be altered due to lack of proper supervision or failure to make proper provisions in time.
5. Notify the Authority Having Jurisdiction when work is ready for inspection.

D. Coordination of Installation:

1. Bring to the Owner Representative's attention prior to installation any conflicts with other trades which will result in unavoidable contact to the equipment, piping, etc., described herein due to inadequate space, etc.
2. Bring to the Owner Representative's attention any discrepancies between the specifications and field conditions, changes required due to specific equipment selection, etc., prior to installation.

3. Provide written notification to Owner's Representative a minimum of fourteen (14) days prior to a utility shut down.
4. Obtain inspection and approval from the Owner's Representative of any installation to be covered or enclosed prior to such closure.
5. Restoration of Damage: Repair or replace, as directed by Owner's Representative, materials and parts of premises which become damaged as result of installation of work of this Division. Remove replaced parts from premises.
6. Where new pipes are to be connected to an existing pipe or a stub provided under another section, verify location, size, elevation and all other information necessary for connection. This verification shall be done at the start of construction. Should there be a problem, contact the IOR and/or Architect immediately to resolve the problem.

1.7 PERMITS, LICENSES AND INSPECTIONS

- A. Obtain and pay for all permits, fees and inspections required by work under this Section.
- B. Inspections: All work shall be regularly inspected by the Authority Having Jurisdiction. Certificates of approval shall be delivered to the Owner's Representative.

1.8 SERVICE CONNECTIONS

- A. Arrange and pay all costs for utilities required to complete work of this section. Connection to all on-site services, payment of service charges, and provision for the installation of temporary utilities are included.
- B. Certain site utilities are to be connected to and/or extended. Before laying of any pipe or digging of any trenches, Contractor shall determine by actual excavation and measurement exact location and depth of lines to which is to be connected. In event depth of lines is not sufficient to permit connection in manner indicated; Contractor shall obtain direction from the Owner's Representative before proceeding with this work.
- C. Verify that utility company's size their services and meters to suit ultimate demand indicated on the drawings.
- D. Gas Service and Meter Assembly: The Contractor shall arrange with the serving utility company for the installation of new gas service with complete meter assembly of the capacity indicated and in locations shown on the drawings. All items served with gas shall be operated at full fire and adjusted by the Contractor. In cooperation with Gas Company, make all required adjustments to main gas pressure regulators. The Owner shall pay for all required fees.

- E. Sanitary Sewer: The Contractor shall be responsible for the soil and waste piping outside of the building to civil site stub and within the building itself.
- F. Domestic Water: The Contractor shall be responsible for the domestic water service outside of the building to civil site stub and within the building itself.
- G. Storm Drain: The Contractor shall be responsible for the storm drain service outside of the building to civil site stub and within the building itself.

1.9 NOISE AND VIBRATION

- A. Cooperate in reducing objectionable noise or vibration. If noise or vibration, as a result of improper installation, occurs in the building, correct these conditions at no cost to the Owner.

1.10 QUALITY ASSURANCE

- A. Qualifications:
 - 1. For the actual installation and testing of work under this section use only thoroughly trained and experienced work personnel completely familiar with the items required and the manufacturer's current methods of installation.
 - 2. In acceptance or rejection of the finished installation, no allowance will be made for lack of skill.
 - 3. The execution of the work shall be in strict accordance with the best practice of the trades, the intent of this specification, and all codes and ordinances.
- B. Contractor's Qualifications: A firm with at least five (5) years of successful installation experience on projects with plumbing systems work similar and of comparable size and scope to that required for this project. The installer shall have performed at least five (5) similar projects in the San Francisco Bay Area. Contractor shall be prepared to submit written evidence of the installer's experience.
- C. Manufacturer's Qualifications: Firms regularly engaged in manufacture of plumbing products, of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than five (5) years.
- D. All materials and equipment installed as part of this work shall be new and the manufacturer's current model.
- E. Soldering: Soldering of copper tubing shall be done in accordance with the Copper Development Association Copper Tube Handbook Instruction on Joining and Forming Copper Tube, Soldered Joints. Permits for on-site soldering shall be obtained from Fire Marshal.
- F. Brazing: Brazing of copper tubing shall be done in accordance with the standards of the American Welding Society or the Copper Development Association. Copper

Tube Handbook Instruction On Brazing. Permits for on-site brazing shall be obtained from Fire Marshal.

- G. Welded Joints: Weld in accordance with procedures established and qualified per ANSI B31.2. Each welder and welding operator shall be qualified for the ANSI procedures as evidenced by a copy of a certified ANSI B31.2 qualification test. Contractor shall conduct the ANSI qualification test. Permits for on-site welding shall be obtained from Fire Marshal.

1.11 PRODUCTS

- A. Products shall be obtained from local suppliers or suppliers with local representation. Items of the same type shall all be purchased from the same supplier.
- B. Protection: Use all means necessary to protect the materials of this section before, during and after installation and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner's Representative.
- D. Protection of Materials:
 - 1. Protect materials, equipment and apparatus provided under this Division from damage, water, dust, or similar impairment, both in storage and installation until Notice of Completion has been filed. Materials, equipment or apparatus damaged because of improper storage or protection will be rejected and must be removed from site.
 - 2. Cap openings in pipes with manufactured caps or fittings. Do not use taped caps.
 - 3. Protect premises and work of other Divisions from damage arising out of installation of work of this Division.
- E. Prepare valves for shipping as follows:
 - 1. Protect internal parts against rust and corrosion.
 - 2. Protect threads, flange faces, and soldered ends.
 - 3. Set ball valves open to minimize exposure of functional surfaces.
- F. Use the following precautions during storage:
 - 1. Maintain valve end protection.
 - 2. Store valves indoors and maintain at higher-than-ambient-dew-point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

- G. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use operating handles or stems as lifting or rigging points.

1.12 REVIEW OF CONSTRUCTION

- A. The Owner's Representative may review work at any time.
- B. Advise Owner's Representative fourteen (14) calendar days in advance that work is ready for review at following times:
 - 1. Prior to backfilling buried work.
 - 2. Prior to concealment of completed Contract items.
 - 3. When requirements of Contract have been completed.
 - 4. Prior to installation of suspended dry wall ceiling.
- C. Do not or conceal work without Owner Representative's consent.
- D. Maintain on job a set of specifications and drawings for use by the Owner's Representative.
- E. Noncompliance: Should any of the work be covered up or enclosed prior to all required inspections and approvals, uncover the work as required and, after it has been completely inspected and approved, make all repairs and replacements with such materials as are necessary to the approval of the Owner's Representative and at no additional cost to the Owner.

1.13 SYSTEM ACCEPTANCE

- A. Final Review: Request a final review prior to system acceptance after:
 - 1. Completion of the installation of all systems required under the Contract Documents.
 - 2. Submission and acceptance of operating and maintenance data.
 - 3. Completion of pipe, valve and equipment identification.
 - 4. Completion of cleaning.
 - 5. Satisfactory operation of all systems for a period of one (1) week.
- B. Acceptance shall be contingent upon:
 - 1. Completion of final review and correction of all deficiencies.

2. Satisfactory completion of the acceptance tests which shall demonstrate compliance with all performance and technical requirements of the Contract Documents.
3. Submission of as-built drawings.

1.14 DAMAGE BY LEAKS

- A. Contractor shall be responsible for damage to any part of the premises caused by leaks in the pipe or equipment installed under applicable sections for a period of twenty-four (24) months from the date of acceptance of the work by the Owner.

1.15 SUBMITTALS

- A. Submit shop drawings and product data in accordance with Section 01 60 00 Product Requirements and as follows:
- B. Submittal Requirements:
 1. Submit manufacturer's product brochures for all products. Written descriptions of products are not acceptable. Furnish, all at one time, prior to any installation, submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules. Product submittals shall be bound in a three-ring binder, with table of contents and tab set for each system.
 2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
 3. Submittals will be checked for general conformance with the design concept of the project, but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
 4. To be valid, all submittals must:
 - a. Identify project name and location, Contractor's, Subcontractor's, supplier's and manufacturer's name, address, and telephone number.
 - b. Include table of contents.
 - c. Identify manufacturer's name and model numbers.
 - d. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.

- e. Include all pertinent construction, installation, performance and technical data.
- f. Have all product data sheets labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.
- g. Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
- h. Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, and item numbers.

C. Product Data:

- 1. General: Manufacturer's specifications, data sheets, certified drawings, and installation instructions. Include physical and performance data such as weights, sizes, capacities, required clearances, performance curves, acoustical characteristics, finishes, color selection, and accessories. Include certified drawings on major equipment such as water heaters, pumps and tanks.

D. Submit product data and brochures for, but not limited to the following:

- 1. Pipe Material, Fittings and All Piping Specialties.
- 2. Pipe corrosion protection materials.
- 3. Unions, Flanges and Dielectric Isolators.
- 4. Pipe Supports and Seismic Bracing.
- 5. Escutcheons, Flashing and Sleeves.
- 6. Fire stopping, including UL listing system numbers and details.
- 7. Pipe Isolation.
- 8. Insulation.
- 9. Valves (all types).
- 10. Trap Primer Valves.
- 11. Water Hammer Arrestors (Shock Absorbers).
- 12. Thermometers and Pressure Gauges.
- 13. Drains, Cleanouts and Vent Caps.

14. Access Doors.
15. Pipe and equipment markers, and valve tags.
16. Flexible Connectors and Seismic Joints.
17. Hose Bibbs.
18. Plumbing Fixtures and Trim.
19. Pumps (all types).
20. Expansion Tanks and Storage Tanks.
21. Water Heaters.
22. Mixing Valves.

E. Shop Drawings:

1. General: Prepare and submit plans, sections, details and diagrams to required scales for specified areas. Drawings shall be prepared using AutoCAD 2000 software. Drawings shall be coordinated, dimensioned and indicate equipment, pipe, duct, fire protection, and electrical in relation to architectural and structural features. Include minor piping, drains, etc. Indicate exact locations and elevations of valves, piping specialties, access doors, etc. Complete and detailed shop drawings of a scale equal to or larger than the design documents shall be maintained throughout the coordination and construction phase indicating all equipment trades' work clearly. All equipment including piping, etc. shall clearly indicate both top and bottom elevations as well as distances from equipment to established building lines. Coordinate with other trades and field conditions and show dimensions and details including building construction and access for servicing.
2. Use of contract documents for shop drawings is not acceptable.
3. Required Drawings: Prepare and submit drawings for all areas and all plumbing work. Scale shall be minimum 1/4"=1'-0" in mechanical rooms, toilet areas, and a minimum 1/8"=1'-0" elsewhere.

1.16 SUBSTITUTIONS

- A. Base manufacturer is indicated in the equipment schedules and specifications. In specification, additional acceptable manufacturers may be indicated. Other manufacturers, materials, or methods shall not be used unless approved in writing by the Owner's Representative. The burden of proof as to the equality of any proposed substitute manufacturer, material, or method shall be upon the contractor. Substitutions, shall be submitted as follows:

1. Requests for substitution review and acceptance shall be accomplished by table of comparison listing pertinent features of both specified and proposed materials, such as material of construction, replacement or maintenance access, motor type, horsepower, voltage, phase, service factor. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for specified item shall be placed side by side with product data sheets for the corresponding proposed substitution item within the submittal. In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION". Review of proposed substitutions will not be made until receipt of satisfactory comparison tabulation.
2. Provide calculations and other detailed data justifying how items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.
3. It shall be the responsibility of the Contractor to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be reviewed and re-submittal will not be allowed.
4. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
5. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all of the proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
6. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.
7. The Owner or their authorized representative shall be the sole judge as to the quality and suitability of proposed alternate equipment, fixtures or materials. Decisions of the Owner or that of their representative shall be final and conclusive.
8. Submittal of substitutions shall be limited to one proposal for each type or kind of item, unless otherwise permitted by the Owner's Representative. If

first proposed product submittal is rejected, Contractor shall submit the first-named or scheduled product.

9. Contractor shall be responsible for all costs and coordination due to the substitution, such as impacts on electrical requirements, weights, openings in slabs and roofs, structural framing, housekeeping pad size, etc.
10. All costs incurred to revise the contract drawings by the Engineer for re-submittal to the building department or Authority Having Jurisdiction, indicating the as-installed condition, shall become the responsibility of the Contractor.

1.17 RECORD DRAWINGS

- A. Record of Job Progress: Keep an accurate dimensional record of the "As-built" locations of all work as required. This record shall be kept up-to-date on prints as the job progresses and shall be available for inspection at all times. In addition, record drawings are to be used by the Owner's Representative for job review and field inspections.
 1. Where enlarged plans are provided in the construction set, contractor markups shall be kept on the enlarged plans.
- B. "As-Built" documentation shall be transmitted to the Owner within ten (10) days after Owner Representative's acceptance of the completed installation. As-built documentation shall include the following (Unless noted elsewhere, furnish number of copies indicated):
 1. Three copies of white bond as-built. One (1) copy of final AutoCAD drawing files shall also be provided on CD disk.
 2. Four (4) sets of manufacturer's literature and data updated to include submittal review comments and any equipment substitutions.
 3. Four (4) sets of operation and maintenance data updated to include submittal review comments and any equipment substitutions.
 4. Manufacturer's literature, reports and operation and maintenance data shall be in a labeled three (3) ring binder.
- C. Submit in accordance with Section 01 72 00 Project Record Drawings and Section 01 72 50 Electronic Documentation of Project.

1.18 OPERATION AND MAINTENANCE DATA

- A. The installing contractor shall provide:
 1. All literature and instructions provided by the manufacturer describing proper operation and maintenance of any equipment and devices installed.

- B. Data shall include, but is not limited to, the following: list of all equipment with manufacturer's name, model number, local representative, service facilities and normal channel of supply for each item. O&M manuals shall be bound in a three (3) ring binder, with table of contents and tab set for each system. "Operation and Maintenance to match "Product Submittals".
1. System Description: Description of start-up and operating procedures.
 2. Controls: Diagrams and description of operating sequence of each system.
 3. Equipment: Manufacturer's brochures, ratings, certified shop drawings, lubrication charts and data, parts list with parts numbers. Mark each sheet with identification number and actual installed condition.
 4. Materials and Accessories: Manufacturer's brochures parts lists with part numbers and lubrication data where applicable. Mark each sheet with equipment identification number or system and location of installation; and to specifically identify which options are provided (in case where data sheet shows multiple options).
 5. Certificate of factory tests and code compliance as specified.
 6. Recommend preventive maintenance schedule and procedures.

2.0 PRODUCTS

2.1 PLUMBING FIXTURES AND TRIM

- A. Refer to plumbing fixture schedule in construction documents for fixture specifications.
1. Fixtures and equipment shall be certified by the State Authorities and comply with the efficiency standards and water usage requirements of State and Local Authorities.
- B. General: Provide factory fabricated fixtures of type, style and material indicated.
1. Plumbing Fittings, trim and accessories:
 - a. Water Outlets: At locations where water is supplied (by manual, automatic or remote control), provide commercial quality faucets, valves or dispensing devices of type and size indicated. Include manual shutoff valves and connecting stem pipes to permit outlet servicing without shut-down of water supply piping systems. Stop valves shall be provided at each fixture.
 - b. Vacuum Breakers: provide with flush valves and water outlets equipped for hose attachment.

2. Provide materials which have been selected for their surface flatness and smoothness. Exposed surfaces which exhibit pitting seam marks, roller marks, foundry sand holes, stains, discoloration or other imperfections on finished units are not acceptable.
3. Where piping, fittings, trim and accessories are exposed or semi-exposed provide bright chrome plated or polished stainless-steel units. Provide copper or brass where not exposed.
4. Escutcheons: Where fixture supplies and drains penetrate walls, provide chrome plated brass escutcheons. Provide box style escutcheons for p-trap penetrations.
5. Stainless steel fixtures conforming to ANSI A112.19.3M. Type 302/304, hardest workable temper. Finish shall be No., 4, bright, directional polish on exposed surfaces, or as indicated.
6. Vitreous China: White vitreous china unless otherwise noted. Fixtures conforming to ANSI A1 High quality, from fire cracks, spots, blisters, pinholes and specks; glaze exposed surfaces, and test for crazing resistance in accordance with ASTM C-554.
7. Traps: Lavatory and sink p-traps shall be commercial grade, chrome plated cast brass body with cleanout, with 17-gauge brass adjustable wall bend, cast brass nipple, 17-gauge tube, and cast brass slip nuts. No reducing washers allowed. Trap shall be provided with forged brass with brass box style escutcheon. Traps to have a 2" water seal and rough-in complete. Trap adapter extensions are not allowed. Trap shall be by CSA or other recognized testing authority and bear manufacturers name. Brasscraft Commercial, McGuire, or Zurn Commercial.
8. Lavatory and sink water supply shall be heavy duty commercial grade and include chrome plated all-brass stops with all-brass stem (no plastic stems allowed) and loose-key handle. Kits shall have chrome plated flexible copper risers and deep forged brass with setscrew flange and have EPDM washers. Inlet shall be IPS with chrome plated nipple. Supply riser lengths to conform to fixture manufacturers recommended rough-in dimensions. Outlets shall be compression. Stops shall be certified to 200psi line pressure. Supply kit shall be certified by CSA or other recognized testing authority, bare manufacturers name and comply with the SDWA (Safe Water Act) "No Lead" restrictions AB1953. Supply kits shall be Brasscraft Commercial, McGuire, or Zurn Commercial.
9. Lavatory grid drains to have chrome plated cast brass strainer (with overflow for lavatories with overflow drains) with brass lock nut. Drain tailpiece shall be seamless brass tube and a 6" long. Provide offset type for ADA accessible fixtures. Grid drain shall be certified by CSA or other recognized testing authority. Drain body shall bear manufacturers name so as to be visible after installation.

10. Product submittals for p-traps and lavatory grid drains shall include documentation that product is CSA listed or other recognized testing authority.
11. Water Connections: Shall have rigid metal to metal connections. Slip joints utilizing non-metallic washers are not permitted. All fixtures shall have stops or valves. All stops shall be lock-shield type, unless otherwise noted.
12. Provide Schedule 40 red brass nipples at copper lines serving fixtures. Galvanized nipples are not allowed.
13. Fixture Supports:
 - a. Carriers: Fixture supports for all off-floor plumbing fixtures conforming to ANSI A1 Provide floor mounted commercial grade cast-iron supports for fixtures of either graphitic gray iron, ductile iron, malleable iron, or steel as indicated. Carriers for water closets shall be rated to support loads of up to 500 lbs. Submittals indicate that water closet carriers can meet this requirement. Provide cast iron nipples and couplings for water closets and urinals. ABS is not acceptable. Carriers shall be manufactured by J.R. Smith or Zurn.
 - b. Backing: For fixtures other than those specified or required to be furnished with carriers, 1-1/4" x 6" wide steel flat plate welded to steel studs or secured to brick or concrete, drilled and tapped to match hanger. Also install backing where bottom of fixture meets wall. Bolt fixtures to backing through holes in fixture casting.
14. Fixture Bolt Caps: Provide manufacturer's standard exposed fixture bolt caps finished to match fixture finish.
15. Flush Valve Supports: All flush valves shall be installed to prevent movement. Supply pipe serving flush valves shall be installed with Holdrite #102-26 flush valve support (#114-C for wall mounted water closets). Supply pipe to be soldered to the support.
16. Accessible Fixtures
 - a. All exposed lavatory and sink trim under the fixture on wheelchair accessible fixtures shall be covered with a white anti-microbial vinyl insulating outer shell. Material shall be flame retardant and fungal and bacterial resistant. Insulating kits shall include covers for drain tailpiece, drain offsets, all p-trap components and hot and cold-water supplies including supply risers. Insulation kits shall be Truebro Lav Guard 2, or equal.
 - b. Shall meet the requirements of the Americans with Disabilities Act (ADA).

2.2 STORM, SOIL, WASTE & VENT PIPING SYSTEMS

- A. Above and Below Ground: No-hub cast iron soil pipe and fittings manufactured from gray cast iron with a tensile strength of not less than 21,000 psi, bituminous coated interior and exterior, conforming to the requirements of ASTM A888 and CISPI Standard 301. Each length of pipe shall be hydrostatically (water) tested by the manufacturer to verify compliance. All pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute and listed by NSF international. All pipe and fittings shall be of the same manufacturer.
- B. Above and Below Ground: Schedule 40 ABS plastic DWV (or Schedule 40 solid wall PVC only is requested in writing from the Owner) with solvent cement fittings.
1. Underground plastic DWV piping systems shall be installed per ASTM D2321.
- C. No Hub Couplings:
1. Above Ground: No-hub couplings shall comply with CISPI 310 and bear the NSF trademark. No-Hub couplings shall be constructed of Type 304 stainless steel with 305 stainless steel worm drive screws. The worm drive clamps shall have a hexagon head to accept a 3/8-inch socketed torque wrench. The clamps shall be tightened to a minimum of 80-inch pounds. (Single corrugated shield, 4 band 80-inch pound torque or 2 band 80 inch pound torque minimum). The gasket material shall be neoprene rubber meeting the requirements of ASTM C-564. Submittal to include copy of compliance to the requirements of FM 1680 Class I by certified independent third-party testing laboratory. No-Hub couplings shall be Husky SD2000 or Clamp-All High Torq 80. No coupling reducing fittings allowed.
 2. Below Ground: No-hub couplings shall comply with CISPI 310 and all requirements of Factory Mutual 1680 Class I, 15 PSI rated pressure. No-Hub couplings shall be constructed of Type 304 stainless steel with 305 stainless steel worm drive screws. The worm drive clamps shall have a hexagon head to accept a 3/8-inch socketed torque wrench. The clamps shall be tightened to a minimum of 80-inch pounds. (Single corrugated shield, 4 band 80-inch pound torque or 2 band 125-inch pound torque minimum). The gasket material shall be neoprene rubber meeting the requirements of ASTM C-564. Submittal to include copy of compliance to the requirements of FM 1680 Class I by certified independent third-party testing laboratory. No-Hub couplings shall be Husky SD4000 or Clamp-All High Torq 125. No coupling reducing fittings allowed.

2.3 DOMESTIC HOT AND COLD-WATER PIPING SYSTEMS

- A. Above Ground:
1. Copper Tube: Type 'L', hard-drawn temper, ASTM copper tubing with ANSI B16.22 wrought copper sweat type fittings or copper pressure seal fittings.

Pipe shall be NSF 61 Certified and bear the NSF Certification mark. Submittal to include that pipe is NSF 61 certified.

2. Solder for Copper Piping: Lead-free, antimony-free, cadmium-free, non-toxic solder, 95.5% tin, 4% copper and 0.5% silver. Engelhard 100, or equal.
3. Mechanically formed tee fittings are not acceptable.
4. Fittings: Wrought copper or cast brass solder sweat type. Elkhart EPC or equal

B. Below Ground:

1. Tube Size 3" and Smaller: Copper tube; Type "K", hard-drawn temper; wrought-copper fittings, brazed-joints, long radius elbows. Pipe shall be NSF 61 Certified and bear the NSF Certification mark. Submittal to include documentation that pipe is NSF 61 certified.
2. Piping below building floor shall be Type "K" soft annealed copper tubing with no fittings below the slab.
3. Solder for Copper Piping: Lead-free, antimony-free, cadmium-free, non-toxic solder, 95.5% tin, 4% copper and 0.5% silver. Engelhard 100, or equal.
4. Trap primer: use plastic-coated tube, Streamline 'PlumbShield' or equal plastic-coated Type K tubing. Comply with manufacturer's installation instructions.
5. Provide concrete thrust blocks at all changes in direction, changes in size, stops and dead ends, and at valves where thrusts may be expected.

2.4 CONDENSATE PIPING SYSTEMS

- A. Copper Tube: Type 'M', hard-drawn temper, ASTM copper tubing with ANSI B16.22 wrought copper sweat type fittings. Pipe shall be NSF 61 Certified and bear the NSF Certification mark. Submittal to include that pipe is NSF 61 certified.
- B. Solder for Copper Piping: Lead-free, antimony-free, cadmium-free, non-toxic solder, 95.5% tin, 4% copper and 0.5% silver. Engelhard 100, or equal.
- C. Schedule 80 CPVC DWV piping and fittings installed per ASTM F439.
- D. For all high efficiency condensing equipment: Schedule 40 PVC upstream of Heat Transfer Products model N110 inline condensate neutralizer and type "M" copper downstream. Neutralizer to be located at equipment condensate drain outlet.
- E. For connections to equipment on vibration isolators provide flexible connector after trap.

2.5 INDIRECT WASTE PIPING SYSTEMS

- A. Pipe size 1" and smaller: ASTM B88 DWV copper pipe and fittings.
- B. Pipe size 1-1/4" and larger: ASTM B306 DWV copper pipe and fittings.
- C. Solder for Copper Piping: Lead-free, antimony-free, cadmium-free, non-toxic solder, 95.5% tin, 4% copper and 0.5% silver Engelhard Silvabrite 100, or equal.

2.6 NATURAL GAS PIPING

A. Natural Gas Piping Above Ground:

- 1. Piping 2" and smaller: ASTM A53 schedule 40 black steel pipe with ANSI 150 lb. ANSI B16.3 malleable iron screwed fittings or Carbon Steel Press Connect Fittings: 1/2 inch through 2 inch

Press fittings shall conform to CSA/IAPMO LC-4 and ICC-ES PMG1036.

Press fittings shall be equal to ASTM A-106 Grade A Carbon Steel with Zinc-nickel coating and designed for use with IPS schedule 10 thru schedule 40 carbon steel or galvanized pipe conforming to ASTM A53, ASTM A106, ASTM A135, or ASTM A795.

Press fittings shall have an HNBR sealing element, 420 stainless steel grip ring, 304 stainless steel separator ring, and Yellow color coded Press Indicator rings.

Fittings and valves must be of same manufacturer.

Ball Valve: Apollo 89FVH

Manufactured by Apollo Power Press

- 2. Piping 2-1/2" and larger: ASTM A53 schedule 40 black steel pipe with ANSI B16.9 standard weight, butt type welded fittings.
- 3. Exposed to weather: Galvanized steel pipe and fittings.
- 4. All exposed threads shall be primed with one coat of rust inhibiting paint.

B. Natural Gas Piping Below Ground: Underground gas piping shall be 40 SDR-Polyethylene (Yellow) as manufactured by Plexco, or equal. Fittings shall be socket or heat fusion weld Polyethylene as manufactured by Plexco, Central, or equal.

- 1. Pipe shall be manufactured, tested and marked in strict conformance with the requirements of the following:
 - a. Plastic pipe: ASTM D 25 13,
 - b. Plastic pipe, fittings: ASTM D 1248 and D 3350 for a PE 2406 material.

2. Transition fittings: I.P.S. schedule 40 steel x I.P.S., SDR-11 P.E.2406, polyethylene, with epoxy coating on the steel section and steel' end beveled for welding. Approximately 24 inches long with tamperproof, gas tight, mechanical seal, internally reinforced, at the midpoint.
- C. Secondary Containment Pipe: The secondary containment piping system shall be +GF+ Contain-It, as manufactured by Georg Fischer Sloane Inc. **NO SUBSTITUTION WILL BE ACCEPTED.** The piping system shall consist of clear unpigmented Polyvinyl Chloride pipe and fittings. The pipe shall be either solid or longitudinally split. The fittings shall be manufactured in two equal halves. The pipe shall align via tongue and groove construction. The pipe and fitting joints shall be welded together via the George Fischer Injection Bonding Process. Prior to injection bonding, the fittings shall be held together by the clips provided. The clips shall be affixed over the integral fitting clip locators. Final containment inspection shall be accomplished via low pressure air per manufacturer's recommendation. After test, remove any plugs installed on the vent side so the system can be vented to the roof. This is a non-pressure system and shall be vented through the roof.
CONTRACTOR TO CALL W & R INDUSTRIAL PRODUCTS, INC. (925) 602-9700 FOR INSTRUCTIONS FOR THE INSTALLATION OF CONTAIN-IT.

2.7 DRAINS

- A. Conforming to ANSI A1.
- B. Coated cast iron body, except as noted, with integral double drainage flange, weep holes and inside caulked bottom or no-hub outlet.
- C. Provide cast iron P-trap at all floor drains, floor sinks and trench drains. All floor drains to have trap primers.
- D. Coordinate drain, area drain, trench drains, and floor sink rim elevations to be flush with finish floor and at low point of floor.

2.8 TRAP PRIMER VALVES

- A. Corrosion resistant brass containing no springs or diaphragms, activated by a 5 to 10 psi pressure drop, provide with distribution unit where serving 2 to 4 drains, ASSE 1018 certified and Listed with Precision Plumbing Products Model P-1 & P-2 with DU Series distribution unit, or equal.
- B. Provide trap primers for all floor drains including piping floor drain to trap primer valve. Provide shut-off valve upstream of trap primer valve.
- C. When concealed, provide access panel for maintenance or replacement. Use size appropriate for access.

2.9 CLEANOUTS

- A. Conforming to ANSI A112.36.2. Cleanouts shall be manufactured by J.R. Smith or Zurn.
- B. Cast bronze, full size up to four inch.
- C. Floor Cleanouts: J.R. Smith Fig. 4026-U-F-C, coated cast iron adjustable floor cleanout with inside caulk connection, flange with flashing clamp, internal bronze plug, scoriated round nickel bronze cover secure to rim with vandal-resistant screws.
- D. Wall Cleanouts: J.R. Smith fig. 4422C-U and fig. 4532S-U, cast bronze taper thread plugs with stainless steel cover and vandal-resistant screws. Screw length as required meeting installation requirements. Wall cleanouts shall be located a minimum of 18" above finished floor.

2.10 VALVES

- A. General:
 - 1. All valves used for domestic water shall meet the criteria of California AB1953 low lead provisions.
 - 2. Provide all valves of first quality of approved manufacturer, have proper clearances, and be tight at the specified test pressure. Mark on each valve the maker's name or brand, the figure or list number, and the guaranteed working pressure cast on the body and cast or stamped on the bonnet, or provided with other means of easy identification.
 - 3. All valves must be of the product of one manufacturer, except for special application. Figure numbers of manufacturers are listed to indicate the types selected for design, performance and standard of quality and appearance.
 - 4. Valve Design: Rising stem or outside screw and yoke stems. Non-rising stem valves may be used where space conditions prevent full extension of rising stems. Provide Class 150 valves meeting the valve specifications where Class 125 valves are specified but are not available.
 - 5. Sizes: Same size as upstream pipe, unless otherwise indicated.
 - 6. Operators:
 - a. Hand wheels fastened to valve stem for all valves other than quarter turn.
 - b. Lever handles on quarter-turn valves, 6 inch and 8 inch and larger gear operated, except for plug valves. Provide plug valves with square heads and operating wrench. Provide gear operator for valves 8 inch or larger.

7. Extended stems: Where insulation is indicated, or specified, provide extended stems arranged to receive insulation. Therma-Seal thermal insulating tee-handle to be used on 2 1/2" and smaller ball valves.
 8. End Connection: Valves 2" and under shall be sweat, press, or threaded, 2-1/2" and larger shall be flanged or full lug style.
 9. Figure numbers of manufacturers are listed to indicate the types selected for design, performance and standard of quality and appearance.
- B. Ball Valves: MSS SP-110; rated for 150 psi saturated steam pressure, 600 psi WOG pressure; full port, two or three-piece bronze body construction, bronze alloy shall be bismuth, chrome plated solid bronze ball with slot venting for steam service, blowout proof stem, reinforced "Teflon" seat and seals, separate adjustable packing gland and nut, and vinyl covered steel handle. Provide locking type handle where required. Where valve actuation is required valve ball and stem shall be stainless steel.
1. Valves 2" and Smaller: Apollo 77CLF-100A/77CLF-200A, Nibco T/S-685-80-LF, Watts Series LFB6080/LFB6081 or equal.
 2. Valves 2-1/2" and Larger: Use butterfly valve.
- C. Butterfly Valves: MSS SP-67; rated at 200 psi, body conforming to ASTM A 126, Class B. Provide full lug style valves with field replaceable EPDM phenolic backed sleeve, aluminum bronze disc, stainless steel stem, and EPDM O-ring stem seals. Provide lever operators with locks.
1. Apollo LD-141, Nibco LD-2000, Watts Model BF03-121-45/BF03-121-4G or equal.
- D. Check Valves:
1. Swing Check Valves: 2" and Smaller: MSS SP-80; Class 125, 200 psi WOG, cast-bronze body and cap conforming to ASTM B 62; with horizontal swing, Y-pattern, and bronze disc. Provide valves capable of being refitted while the valve remains in the line.
 - a. Apollo 163LF T/S, Nibco T/S-413-Y-LF or equal.
 2. Swing Check Valves: 2-1/2" and Larger: MSS SP-71; Class 125, 200 psi WOG, cast iron body and bolted cap conforming to ASTM A 126, Class B; horizontal wing, and bronze disc or cast-iron disc with bronze disc ring, flanged ends. Provide valves capable of being refitted while the valve remains in the line.
 - a. Apollo 910FLF-A, Nibco F-918-N or equal.
 3. Lift Check Valves: 2-Inch and Smaller: Class 125; cast-bronze body and cap conforming to ASTM B 62; horizontal or angle pattern, lift-type valve, with

stainless steel spring, bronze disc holder with renewable "Teflon" disc. Provide valves capable of being refitted and ground while the valve remains in the line.

- a. Nibco or equal.
4. Non-Slam Check Valves: Provide non-slam check valves on the discharge of pumps. Check valves to be silent closing, class 125, iron body, bronze mounted spring leaded center guide.
 - a. Valves 2" and Smaller: Apollo 61LF, Nibco T/S-480-Y-LF or equal.
 - b. Valves 2-1/2" and Larger: Nibco F-910-B or equal.
- E. Water Pressure Relief Valves: Provide ASME labeled, bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, Wilkins No. P174A, Apollo 10-600, or equal.
 - F. Combination Pressure and Temperature Relief Valves: Provide ASME labeled, adjustable bronze spring and diaphragm combination pressure and temperature type with test lever and automatically reseating type thermostatic element, Relief valve shall be type as recommended by the water heater equipment manufacturer.
 - G. Natural Gas Provide AGA/CGA listed gas valves for natural gas piping system.
 1. Valves 2" and smaller: MSS SP-110; full port, two-piece body, blowout proof stem, lever handle, screwed ends, 600 psi WOG rated, AGA/CGA/UL listed and FM approved, Apollo 94A, Red & White #5044 or equal.
 2. Valves 2-1/2" to 6": Provide lubricated plug type, bronze body, standard port, spring balanced plug & stem, 1/4 turn operation, flanged ends, and include operating wrench and locking device, UL/CGA Listed, Homestead #612, or equal.
 - H. Balancing Valves: Fully assembled, forged brass body, 304 stainless steel parts, EPDM O-rings, 20 mesh stainless steel strainer, nickel-plated brass ball valve, 400 psi/250°F rated, accessible flow control cartridge, ports for testing, Griswold Isolator "R" Series, or equal.
 - I. Gas Regulators: American Meter Company Series 1200, 1800, 1803, and 3000, or equal. Contractor shall size and provide gas regulators based on gas demand, available inlet pressure and required outlet pressure for each application. Provide gas regulator vent line(s) piped to outside, or as indicated on the drawings.
 - J. Seismic Gas Shut-Off Valve: 60 psi pressure, manual reset, high flow efficiency with minimal pressure drop, positive closure, soft seat seating, visual open-close indicator, meets 25-97, U.L. and CGA listed, threaded connections for sizes 2" less, flanged

connections for sizes greater than 2". Pressure drop not exceed 13' equivalent piping length. Size shall match that of gas piping line size Valve shall meet California Standards for Earthquake Actuated Automatic Gas Shut Off Systems, Standard No. 12-23-1 ANSI 221.70 1981. Valve shall be approved by the State of California State Architect. Valve Pacific Seismic Products earthquake activated automatic shut-off valve, or equal.

- K. Valve Box: Christy B03 reinforced concrete utility box with reinforced concrete lid. Provide steel, checker plate, traffic lids on all paved areas and walkways 5'-0" wide or greater.

2.11 WATER HAMMER ARRESTORS (SHOCK ABSORBERS)

- A. Every effort shall be made by the contractor to alleviate hydraulic shock (water hammer). Should water hammer be present in the final installation and water hammer arrestors have not been installed as noted by this specification and all the authorities named within, it shall be the responsibility of the contractor to provide water hammer arrestors per this specification at no additional cost to the Owner.
- B. Locate and size per Plumbing and Drainage Institute Manual WH-201.
- C. Provide water hammer arrestors in water lines to equipment or fixtures having quick closing valves, flush valves, sensor operated metering faucets, mechanical metering faucets, foot pedal valves, knee operated valves, and any equipment that might produce water hammer.
- D. Water hammer arrestors shall be certified by the Plumbing and Drainage Institute (PDI). Water arrestors shall have threaded stainless steel casing, partially filled with liquid and charged with gas as required for line pressure, stainless steel or neoprene bellows, J.R. Smith "Hydrotrol" or Zurn "Shocktrol".
- E. When concealed, provide access panel for maintenance or replacement. Use size appropriate for access.
- F. Provide 6" brass nipple at connections to copper lines.

2.12 CORROSION PROTECTION

- A. All buried copper and steel piping and fittings shall be cleaned, primed then protected by wrapping.
 - 1. Piping 3" and smaller: Prime pipe and machine wrap pipe using 50% overlap wrap, with polyvinyl chloride tape. Hand wrap fittings using 100% overlap wrap extending 6" beyond fitting onto wrapped pipe. Comply with tape manufacturer's installation instructions. Wrap pipe with 3M "Scotchrap 51" corrosion protection tape (20 mils thick) and pipe primer, or equal.
 - 2. Piping 4" and larger: Encase in 8 mil polyethylene tube encasements in accordance with ANSI/AWWA A21.5/C105 and manufacturer's instructions.

3. All below ground metallic fittings, valves, flanges, bolts, shall be protected against corrosion as follows:
 - a. All metallic components as described above shall receive a heavy coating of "Henry's" oil base roof mastic, or equal.
 - b. After mastic coating is completed and inspected, wrap entire metallic component with a minimum of 10 mils. polyethylene wrap as manufactured by Visqueen or equal, overlapped 50% of the circumference and extended beyond ends of component as required for polyethylene to be secured to piping. The overlap seam shall be located to avoid material from entering the encapsulate area. The ends and seam of the of the polyethylene material shall be secured to the piping and sealed with 3M "Scotchrap 51" corrosion protection tape (20 mils thick) and pipe primer, and 2" wide pipe wrap sealing tape.
 - c. The mastic coating shall be inspected and approved prior to the finish application of the polyethylene material, which shall also be inspected.

2.13 PIPE SUPPORTS, ANCHORS, AND HANGERS

- A. Unless detailed on the drawings, all piping shall be supported with, B-Line, Grinnell, Super Strut, Tolco, or equal, pipe hangers and supports. All hangers and supports furnished for this installation shall be of one manufacturer. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide felt lined hangers for copper piping systems.
- B. Special pipe supports for piping in equipment and other locations where shown on drawings shall be constructed as detailed on drawings. Unless otherwise shown on drawings, support channels, frames, brackets, and legs of special supports shall be made of B-Line, Grinnell, Super Strut, Tolco, Unistrut, or equal channels, attaching clips, pipe clamps, and other required accessories. Piping installed within partitions and connected to plumbing fixture trim shall be securely attached to adjustable stud brackets, not more than 2-feet away from and on the inside of wall penetration.
- C. Hanger Rods: Hanger rod size shall be no less than the standard rod sizes listed on the MSSSP-69. Rods shall be steel rods, threaded at ends only with a minimum safety factor of 5 over the imposed load, Tolco Fig. 103, or equal. All thread rods are not acceptable. Provide rod stiffeners as required.
- D. Where beam clamps are used, provide beam clamp retaining strap.
- E. Powder-driven and explosive type fasteners are not allowed.
- F. Equipment Support Members: Install AISC steel beams to accommodate support for pipe and equipment from above when it is not practical to install concrete anchors.

- G. No metallic pipes shall have metal-to-metal contact with hangers, clamps, brackets, or any other pipe support, or be otherwise in direct contact with any part of the building structure.
- H. Finish of all pipe supports attachments, rods, hangers, etc., shall be galvanized or cadmium plated.
- I. Steel for Equipment Support: Support steel shall be of new material conforming to ASTM A36, latest edition. Brackets, supports, etc., fabricated from ferrous metal shall be hot dipped galvanized after fabrication. Steel hangers shall have a safety factor of 4.0 or greater.
- J. Miscellaneous Steel, Bolts, Nuts, Washers, Etc.: Miscellaneous steel angles, channels, brackets, rods, clamps, etc., shall be of new materials conforming to ASTM A36. All steel parts exposed to weather or where noted shall be hot dipped galvanized after fabrication.
- K. All bolts and nuts, except as otherwise specified, shall to ASTM "Standard Specifications for Low Carbon Steel Externally and Internally Threaded Standard Fasteners", Designation A307. Bolts shall have heavy hexagon heads, and nuts shall be of the hexagon heavy series. All bolts, washers, nuts, anchor bolts, screws and other hardware, unless otherwise specified, shall be galvanized, and all galvanized nuts shall have a free running fit. Bolts shall be of ample size and strength for the purpose intended.
- L. Concrete Anchors:
 - 1. For New Concrete Slabs with Metal Decking: B-Line, Hilti, Red Head, or equal, steel deck inserts or wedge type expansion anchors.
 - 2. For New Concrete Floor or Base: B-Line, Hilti, Red Head, or equal, hook bolts, wedge type expansion anchors, or Deco adjustable concrete anchors.
 - 3. For Existing Concrete Slabs: B-Line, Hilti, Red Head, or equal, self-drilling concrete anchors. Locate anchors to clear rebar.
 - 4. Maximum loading on inserts and rods shall not exceed 75 percent of ratings.
 - 5. Powder actuated fastening systems will not be allowed.
- M. Insulated pipes shall be supported with Pipe-Shield, Inc., Model "CS-CW" unless otherwise noted, or equal, pipe hanger shield with waterproofed calcium silicate insulation encased in a galvanized-sheet metal shield completely around the pipe. Shield shall be 26 gauge for pipes up to 1", 22 gauge for 1-1/4" and 1-1/2", 20 gauge for 2" to 8" in size, and 16 gauge for 10" and larger. Insulation shall be same thickness as pipe insulation.

2.14 SEISMIC RESTRAINTS

- A. General Requirements: Seismic restraints shall be provided for all vibration isolated equipment, both supported and suspended, and all vibration isolated piping.
- B. Where anchorage details are not shown on the drawings, the field installation shall be subject to the approval of the mechanical engineer and the project inspector.
- C. All mechanical equipment shall be braced or anchorage to resist horizontal force acting in any direction using the following criteria:
 - 1. The total design lateral seismic force shall be determined from ASCE 7 Section 13.3.1, California Building Code (CBC) 2016. Forces shall be applied in their horizontal directions, which result in the most critical loadings for design. The value of a_p (component amplification factor) and R_p (component of modification factor) of Section 13.3.1 shall be selected from Table 13.6-1, ASCE 7. The value of I_p (seismic importance factor) and S_{DS} (special acceleration) shall be selected from Section 13.1.3 and Section 11.4.4, ASCE 7, respectively.
- D. For Supported Equipment:
 - 1. Pre-approved isolator restraint system by the State of California and bear approval number.
 - 2. Submittal shall include load versus deflection curves up to 1/2" in the x, y, and z planes. Tests shall be conducted in an independent laboratory or under the signed supervision of an independent registered engineer. The snubber assemblies shall be bolted to the test machine as the snubber is normally installed. Test reports shall certify that neither the bridge bearing neoprene elements nor the snubber body has sustained any obvious deformation after release from the load.
 - 3. Submit calculations for each seismic restraint and vibration isolation signed by structural Registered Engineer.
- E. Seismic Restraint Systems for Piping:
 - 1. All seismic bracing required shall be installed as per Chapter 13 of ASCE 7-10 except as modified by Section 1615A of the 2016 CBC.
 - 2. Piping distribution systems shall be braced to resist forces prescribed in ASCE 7-10 Section 13.6.7 and 13.6.8 respectively.
 - 3. The bracing and attachments to the structure shall comply with one of the OSPD Pre-Approvals with OPM #, such as B-Line (OPM 0052-13), Mason Industries (OPM 0043-13), ISAT (OPM 0403-13) as modified to satisfy anchorage requirements of ACI 318 D.
 - 4. Copies of the manual shall be on the jobsite prior to start of hanging and bracing of the pipe distribution systems.

2.15 PIPE ISOLATION

- A. All piping which is not isolated from contact with the building by its insulation shall be installed with a manufactured type isolator. Isolators shall be B-Line "Vibra Clamp" and "Vibra Cushion", Super Strut, "Trisolator", or equal. Piping shall be installed and supported in a manner to provide for expansion without strains. Guides shall be properly installed to ensure this requirement.
- B. Provide pipe and sound isolation for all piping through walls, Acoustoplumb by LSP Products, Holdrite Silencer by Hubbard Enterprises, or equal.

2.16 PIPE INSULATION

- A. General: Conform to NFPA Section 90A, with special regard to the fire hazard requirements of ASTM E84 and NFPA No. 255, latest revision, including vapor barriers and adhesive. All insulation shall be UL listed and shall meet all code requirements, minimum California State Energy Code Title 24. Insulation shall be Owens Corning, Johns-Manville, or equal.
- B. Fire Hazard Rating: Insulation, jackets, facings, adhesives, coatings, and accessories shall be acceptable to the Fire Marshal, and shall not exceed the following fire hazard classifications: Flame-spread: Maximum 25, Fuel Contributed: Maximum 50, Smoke Developed: Maximum 50. Rating to be in accordance with UL Test Method for Fire Hazard Classification of Building Materials, No. 763.
- C. Domestic Cold, Hot, & Hot Water Return: Fiberglass, Heavy Duty 25ASJ/SSL, heavy density, UL listed non-combustible fiberglass segmented pipe insulation with an integral vapor barrier jacket. The jacket shall have a pressure sealing lap adhesive. Insulation density shall be between 4 and 7 PCF. Insulate cold water piping in concealed areas and warm (heated) areas with minimum insulation. Insulate exterior cold-water piping with 1" insulation. Insulation for hot water shall comply with California Title 24 requirements. Required thickness shall be a function of the pipe size as indicated below.
- D. Indoor Piping -Fluid Temperature Range (105°F and Above):

Pipe Diameter	Insulation Thickness
1" and smaller	1"
Up to and including 2"	1.5"
2-1/2" and larger	1.5"

- E. Outdoor Piping -Fluid Temperature Range (105°F and Above):

Pipe Diameter	Insulation Thickness
1" and smaller	1"
Up to and including 1"	1.5"
1-1/4" and larger	2"

- F. Condensate Drain, Storm Drain and Overflow Drain: Elastomeric Insulation; Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
1. Insulate horizontal storm drain and overflow drain lines, elbows up to roof drain body, and roof drain bowls with a 1" thick insulation. Insulate all condensate drains with a minimum of ½" thick insulation.
- G. Insulate fittings, valves, joints, expansion joints, and couplings with insulation of same material and thickness as adjoining pipe. Use pre-molded fiberglass covers or radical mitered segments of pipe insulation. For valves, expansion joints, fittings and accessories requiring servicing or inspection, insulation shall be removable and replaceable without damage. Enclose within two-piece no. 15 gauge aluminum covers fastened with cadmium-plated bolts and nuts. Concealed items shall be labeled. Unions and flanges, strainers, air chambers and water arrestors, need not be insulated.
- H. All insulation shall be continuous through walls, sleeves, pipe supports and hangers, and other pipe penetrations.
- I. Finish insulation at supports, protrusions and interruptions. No hangers or supports shall be embedded in insulation.
- J. For exterior applications and piping exposed to weather, provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover piping and all fittings with 0.016" aluminum or stainless-steel jacket (meeting ASTM B209) with moisture barrier, and with two 318" wide 0.015" thick aluminum or 0.010" thick stainless-steel bands per 3 feet section (18" on center), completely watertight. Lap all joints 2" minimum and seal per manufacturer's recommendations. Locate seams on the bottom side of horizontal piping.
- K. All insulated piping drops exposed in finished areas shall be jacketed in stainless steel jacket, secured and sealed around pipe to prevent entrance of water during cleaning process.
- L. Insulated pipes shall be supported with Pipe-Shield, Inc., Series A-9000, or equal, pipe hanger shield with waterproofed calcium silicate insulation encased in a galvanized sheet metal shield completely around the pipe. Shield shall be 26 gauge for pipes up to 1-1/2", 22 gauge for 2", 20 gauge for 2-1/2" to 8" in size, and 16 gauge for 10" and larger. Insulation shall be same thickness as pipe insulation. Provide calcium silicate insulation with insulation protection saddles and shields at pipe hangers. Insert sections shall be installed on all insulated piping located centrally under each hanger where the insulation rests on hanger. Vapor barriers and jacketing continuous over insert.

2.17 ESCUTCHEONS, FLASHINGS AND SLEEVES

- A. Provide sleeves for each pipe passing through footings, foundations, walls, partitions, floors, roofs and other locations where needed, whether shown or not.

- B. Piping penetrating below grade exterior walls and floors, and floors in all food service areas including pantries, shall be sleeved and made watertight using Thunderline "Link Seal" sealer, or equal.
- C. Sheet metal pipe sleeves: Fabricate from galvanized sheet metal; round tube closed with snap lock joint, welded spiral seams, or welded longitudinal joint. Fabricate from the following gauges: 3" and smaller, 20 gauge; 4" to 6", 16 gauge; over 6", 14 gauge. Adjustcrete, Sleevecrete, or equal.
- D. Set all pipe sleeves and inserts in place before concrete is poured. Coordinate the placing of these items to avoid delaying concrete placing operations.
- E. Sleeves for insulated piping shall be of adequate size to accommodate the full thickness of pipe covering with clearance for packing and caulking. Provide galvanized steel pipe sleeve, minimum 18 gauge, sized for maximum 1-inch space between insulation and sleeve. Omit specified insulation and apply same thickness of UL approved insulation through thickness of wall and extending 1" either side. Provide UL rated ceramic fiber packing. Pack space between sleeve and insulation with packing and seal ends with approved seal. Seal shall be positively fastened using metal plates, or escutcheons. Commercial pipe sleeve assemblies which are UL rated and which have been approved by the fire marshal for this purpose shall be used. Pipe Shields Inc. F1000 series or equal. Use only assemblies which have been designed for the service on which they are to be used.
- F. Caulk space between sleeve and pipe or pipe covering through rated walls, partitions, and floors with fire rated, incombustible, UL listed, permanently plastic, waterproof non-staining compound leaving a finished, smooth appearance. Fire stopping shall be in accordance with specification Section 07 84 13, Fire Stopping and Smoke Seals. Provide supporting backing to secure material in place.
- G. Provide sleeves as follows:

SLEEVE LOCATION	SLEEVE MATERIAL
Interior Wall, Partitions	Galvanized sheet metal
Membrane Waterproof Floor and Roof Construction	Standard weight black steel pipe with flashing clamp device welded or threaded to pipe sleeve. Flashing clamp device J.R. Smith 1720 or equal by Zurn
Non-membrane Floor Construction	Standard weight black steel pipe
Footings and Foundations	Schedule 40 galvanized steel pipe

Exterior Walls	Standard weight galvanized steel pipe with a continuously welded water stop of ¼” steel plate extending from outside of sleeve a minimum of 2” all around
----------------	---

H. Escutcheons, Finish and Plates:

1. Smooth up rough edges around sleeve with plaster.
2. Provide escutcheon plates where exposed pipes pass through walls, ceilings, or floors, in all finished rooms and conspicuous locations. Provide chrome or nickel-plated plates sized to fit pipe and pipe covering and give a finished appearance. Escutcheons held in place by set screws allowing enough clearance to care for expansion and shall be sufficient size to cover the opening around the pipe. Provide plates on pipes extending through sleeves.

2.18 THERMOMETERS

- A. Type: Weksler Fill", or equal, industrial, green reading mercury glass tube, 9" cast of extruded case, double strength glass window, adjustable angle, stainless steel bulb chamber, brass extended separable socket. Provide stainless steel protected shield for outside application. Install for easy reading from floor with clear sight line.
1. Domestic Cold Water: Range of 0-120°F.
 2. Domestic Hot Water: Range of 30 -240°F.
- B. Separable Sockets: Brass 150 psi at with 2%" extension necks. Install vertically in runs of pipe.
- C. Thermometer Wells: Install in piping for all thermometers. Construct to withstand pressure, temperature, and fluid in which installed with extension necks. Install vertically in horizontal runs of pipe.
- D. For thermometers and wells through insulation, provide extensions to compensate for insulation thickness.

2.19 PRESSURE GAUGES

- A. Weksler, or equal, drawn steel or brass case, glass lens, 4½” dial, 1% accuracy, ANSI B40.1 Grade 2A, phosphor bronze, bourdon tube, brass bottom connection.
1. Scale: White coated aluminum with permanently etched markings, black graduations and numerals, 270° arc scale.
 2. Range: Dial range approximately twice the working pressure.
- B. Provide pressure gauge cocks between pressure gauges and gauge tees on piping system.

2.20 VENT THROUGH ROOF

- A. Provide Stoneman No. 1100-5, one (1) piece, four (4) pound, series with reinforcing steel boot counter-flashed with cast iron flashing sleeve and equipped with vandal-proof hood for all vent piping. Seal joint between flashing and pipe with waterproofing compound.
- B. All vents through roof shall be provided with vent caps that have cast iron sleeve and dome secured with recessed Allen key set screws. Vent caps shall be manufactured by J.R. Smith or Zurn.

2.21 ACCESS DOORS AND PANELS

- A. Furnish under this Division where shown and required by Regulatory Agencies for access to all concealed valves, water arrestors, unions, etc. Doors shall be in accordance with requirements of Section 08 31 13. Doors in this Division, Section 08 31 13, and Division 26 shall be from same manufacturer for identical appearance and keying. Sizes: 24" x 24" inches' minimum for ceilings and 12" x 12" minimum for walls. Doors shall be furnished with cylinder locks. Furnish fire rated doors when located in rated construction. Deliver doors for installation under Section 08 31 13. Mark each door to accurately establish its location.

2.22 IDENTIFICATION OF PIPING AND EQUIPMENT

- A. Above ground piping:
 - 1. All piping to be identified as follows: Brady Perma-Code, MSI Marking Services Inc., or equal, pressure sensitive pipe markers consisting of pipe content wording and arrow indicating directions of flow on ANSI color background. Arrow and wording are two separate markers which shall be placed immediately adjacent to each other. Provide at each end of each marker, two and one-fourth inch wide self-sticking clear tape around periphery of pipe or insulation to further secure marker. All markers shall be applied to clean surfaces free of dust, grease, oil or any other material which will prevent adhesion. Install after cleaning, painting and insulation is complete. Pipe identification shall comply with ANSI A13.1 for the "Scheme Identification of Piping Systems".
 - 2. Location and visibility for pipe identification:
 - a. On all horizontal runs spaced twenty feet (20') maximum but not less than once in each room at entrance and exit of each concealed space.
 - b. At each branch and riser takeoff.
 - c. Within one foot (1') of each valve and control device.
 - d. At every change in directional flow.

- e. At every pipe passage through wall, floor and ceiling construction.
- f. Where capped piping is provided for future connections, provide legible and durable metal tags indicating symbol identification.
- g. At all wall and ceiling access
- h. Near major equipment items and other points of origination and termination.
- i. Attention shall be given to visibility with reference to pipe markings. pipe lines are located above or below the normal line of vision; the lettering be placed below or above the horizontal centerline of the pipe.

3. ANSI Color Coding of Piping:

SERVICE	COLOR OF FIELD	COLOR OF TEXT
Domestic Cold Water	Green	White
Domestic Hot Water	Yellow	Black
Domestic Hot Water Return	Yellow	Black
Natural Gas	Yellow	Black
Sanitary Sewer	Green	White
Sanitary Vent	Green	White
Condensate Drain	Yellow	Black

4. Size of Legend Letters:

OUTSIDE DIAMETER OF PIPE COVERING	MINIMUM LENGTH OF COLOR FIELD	MINIMUM SIZE OF TEXT
¾" to 1-¼"	8"	½"
1½" to 2"	8"	¾"
2½" to 6"	12"	1¼"
8" to 10"	24"	2½"
Over 10"	32"	3½"

- 5. All exposed water piping and valves downstream of devices shall be properly identified and labeled as "Non-Potable" water.

B. Buried Utility Warning and Identification Tape:

1. All underground piping shall be identified with underground warning pipe markers as follows: Brady Perma-Code, MSI Marking Services Inc., or equal, non-adhesive four (4) mil polyethylene plastic tape manufactured specifically for warning and identification of buried utility lines. Tape shall be of the type provided in rolls, six inches (6") minimum width, color coded for the utility involved, with warning identification imprinted in bold black letters continuously and repeatedly over entire tape length. Warning and identification for lines shall be "CAUTION (TYPE OF SERVICE) LINE BURIED BELOW". Code and letter coloring shall be permanent, unaffected by moisture and other substances contained in trench backfill material.
2. Run detector tape continuously along pipe and terminate in adjacent valve boxes or other suitable facilities. No splices will be allowed. Locate over buried pipe at twelve inches (12") below finish grade. Protect tape from damage during installation and Tape that is broken, cut or crumpled shall be completely replaced. Install twelve (12") above the top of the respective pipe and twelve (12") below the surface during backfill. Provide detectable type for buried non-metallic pipes.
3. ANSI Color Code of underground tape shall be as follows:

SERVICE	COLOR OF FILED	COLOR OF TEXT
Natural Gas	Yellow	Black
Water	Blue	Black
Sanitary Sewer	Green	Black
Storm Sewer	Green	Black
Electric	Red	Black

C. Valve Identification:

1. All valves shall have brass identification tag as follows: Brady Perma-Code, MSI Marking Services Inc., or equal, brass valve identification tag secured with brass chain and "S" hook. Tags shall bear the service identification and numerical identification of the valve.
2. Engrave identification tags with "normally open" (green) or "normally closed" (red).
3. Tags:
 - a. Minimum two inches (2") square pattern for plumbing and two inches (2") triangle for fire protection.
 - b. No. 18 BS gauge brass with stamped numbers and letters filled in with black enamel paint. Engraving, ink, dye and vinyl fill are not acceptable.

- c. Identifying number and system letter. Top line shall be ¼" characters and should abbreviate the service. Example: Hot Water – HW. The second line shall be characters and should list the valve number. Example: 1st floor shall begin 101, second floor begin 201.
 - d. Attach 6"-12" of brass jack chain around bonnet or stem of the valve in a way that it cannot accidentally come off. Attach appropriate size brass "S" hook to the chain in the most conspicuous location. Hang valve tag from the "S" hook. Valve tag should not be attached to the wheel causing interference with valve operation.
 - e. Provide on: All valves and controls.
4. Where shut-off valves are installed on-branch line leading to emergency safety equipment (emergency showers and eyewashes), the valves shall be locked in the open position labeled for identification.

D. Equipment Identification:

1. Provide engraved plastic nameplates on all plumbing equipment, including but not limited to the following: Pumps (all types), water heaters, heat exchangers, and tanks. Provide nameplates on each piece of equipment and at the disconnect, and the breaker. Nameplates shall conform to the following, provided the equipment accommodate the sizes outlined:
 - a. Black background with white lettering.
 - b. Sizes: Equipment 2" x 4", disconnect 1" x 2½", breaker 1" x 3".
 - c. Lettering shall be ¾" (¼" minimum) or sized for the maximum per nameplate.
 - d. Nameplate shall be provided with both adhesive backing and screw holes to insure permanent application.
 - e. Material shall be 2 ply 1/16" thick with beveled edges.
2. Properly identify each piece of equipment and controls pertaining thereto by nameplates mounted on equipment and controls using round head brass machine screws, pop rivets or contact cement. Cardholders in any form not acceptable. Install with corrosion resistant mechanical fasteners and adhesive and seal with clear lacquer.
3. Place warning signs on machines driven by electric motors which are controlled by fully automatic starters, in accordance with Article 3281, General Industry Safety Orders.
4. Small devices, such as pumps, may be identified with tags.

5. Identify control panels and major control components outside panels with nameplates.
 6. Identify equipment out of view behind access doors, in unfinished rooms on the face of the access door.
 7. All gas pressure regulators shall be identified with proper signs. The upstream pressure shall be identified with a metal tag permanently attached to the regulator and state (with appropriate wording to state actual gas pressure conditions): 5psig natural gas pressure. DO NOT REMOVE, or similar.
 8. At plumbing fixtures where water exceeding 120 degrees is accessible to users, warning signs with letters at least 2 inches high shall be posted above the fixture. Sign shall have "Danger Hot Water/ Tap Symbol" in warning triangle and the words "Danger Hot Water, Use with Caution, Can Cause Severe Burns". Sign shall be approximately 12" high by 8" wide Semi-Rigid PVC and color shall be on White.
- E. Valve and Equipment Identification Charts:
- F. Provide five typewritten schedules giving numbers, service and locations, and notations of open or closed, of all tagged valves. Enclose each schedule in separate transparent plastic binder. List piping systems with symbol and color coding on pipe identification chart. List valve model numbers and symbol for service corresponding to piping symbol on valve identification chart. Provide small "key plan" identifying valves as related to column lines. Schematic flow diagrams of each piping system indicating:
1. Location and function of each tagged valve.
 2. Type, size and essential features of each system.
- G. Submit drafts of valve schedule for review before preparing final sets.
- H. Frame five copies of reviewed schedule under glass, mount where directed.
- I. Provide typewritten list of equipment in triplicate, indicating location, service for each piece of equipment, suitably framed, with glass front.

2.23 STRAINERS

- A. Wye type, with Monel or stainless-steel strainer cylinder and gasketed machined strainer cap, bronze body, threaded, 250 pound, Apollo 59 Series, or equal.

2.24 FLEXIBLE CONNECTORS

- A. All equipment, either rigidly mounted or mounted on vibration isolators, shall be attached to the piping system using flexible connectors designed for seismic

movement. Flexible connectors shall be capable of movement in the $\pm X$, $\pm Y$ and $\pm Z$ planes and must completely isolate the equipment from the piping.

- B. Materials of construction and end fitting type shall be consistent with pipe material and equipment/ pipe connection fittings. For potable water service, connectors shall be classified in accordance with 61-1977 standards.
- C. Flexible connectors attached to fuel gas lines, shall be specifically manufactured for gas applications and certified by the American Gas Association.
- D. Flexible connectors shall be flexible corrugated hose and braid, stainless steel, rated, 125psig minimum, 150 lb flange for pipe sizes 2-1/2" and larger and threaded ends for 2" and smaller, as manufactured by Dormont Manufacturing Co., or equal. Provide flexible metal hose assembly as shown on the drawings.

3.0 EXECUTION

3.1 DRAWINGS AND SITE

- A. Drawings:
 - 1. All scaled and figured dimensions are approximate and are given for estimate purposes only. Before proceeding with any work, carefully check and verify all dimensions, sizes, lengths, etc.
 - 2. So far as possible the work has been on the drawings in such positions as to suit and accommodate the work of the other trades, but the work as indicated is largely diagrammatic and is shown primarily for clarity. Contractor is responsible for the correct placing of their work and the proper location and connection of work in relation to the work of other trades.
 - 3. Where apparatus and equipment have been indicated on the drawings, dimensions have been taken from typical equipment of the class indicated. Carefully check the drawings to see that the equipment will fit into the spaces provided.
 - 4. Where equipment is furnished by others, verify dimensions and the correct locations of this equipment before proceeding with the roughing-in of connections.
 - 5. Contact Owner's Representative before any digging and investigate all existing conditions. Secure permit from Owner's Representative prior to initiation of underground excavation.

3.2 GENERAL PIPING INSTALLATION

- A. Carry all exposed and concealed horizontal lines of pipe on specified hangers properly spaced and set to allow the pipe to adjust for expansion and contraction. Use

trapeze hangers for supporting groups of pipes. Piping in parallel shall be evenly spaced and supported.

- B. Conceal all piping in furred walls and partitions and pipe spaces except where specifically noted otherwise. Check all piping runs beforehand with all other trades. Run piping to maintain proper clearance for maintenance and to clear opening in exposed area. Run piping in strict coordination with mechanical piping, ducts, and equipment, plumbing work, all electrical conduit and equipment, structural, and architectural conditions. Where work of other trades prevents installation of the piping as shown on the Drawings, reroute piping at no extra cost. Verify all inverts in pitched lines before starting work.
- C. Install all exposed piping parallel to or at right angles with building walls and tight to walls or ceilings wherever possible, except where otherwise shown on the Drawings.
- D. No valve and no piece of equipment or trim shall support the weight of any pipe.
- E. Support all pipe from the building structure so that there is no apparent deflection in pipe runs. Fit piping with steel sway braces and anchors to prevent vibration and/or horizontal displacement under load when required. Do not support pipe from or brace to ducts, other pipes, conduit, or any materials shown on the Drawings. Piping or equipment be immobile and shall not be supported or hung by wire, rope, plumber's tape or blocking of any kind.
- F. Install all piping free from traps and air pockets and true to line and grade.
- G. Wherever changes in sizes of piping occur, make such changes with reducing fittings, as the use of face bushings will not, in general, be permitted. Install eccentric reducing fittings where necessary to provide free drainage of lines.
- H. Furnish and install insulating unions or insulating flanges as hereinbefore specified at all connections of ferrous and non-ferrous piping.
- I. Fire stop all pipes penetrating fire rated construction in accordance with specification Section 07 84 13, Fire Stopping and Smoke Seals.
- J. No cutting or drilling of structural members shall be done without prior written approval of structural engineer.
- K. Rough-In Work: Proceed as rapidly as the building construction will permit. All piping shall be completed, tested and approved before being enclosed.
- L. Thoroughly clean piping before installation. Cap all pipe openings to exclude dirt until fixtures are installed and final connections are made.
- M. Provide a drip at any point in the gas lines where condensate may collect. All drips shall be readily accessible to permit cleaning or emptying.

- N. Show no tool marks or threads on exposed plated, polished or enameled connections to fixtures.
- O. Provide each connection to faucet or fixture with an air chamber, eighteen inches (18") long, placed in a vertical position and one (1) pipe size larger than the pipe served.
- P. Pitch: Horizontal sanitary and storm drain piping shall be installed at a uniform grade of not less than one-fourth inch ($\frac{1}{4}$ ") per foot, unless otherwise indicated or directed.
- Q. Contraction and Expansion: Install all work in such a manner that its contraction and expansion will not do any damage to the pipes, the connected equipment, or the building. Install offsets, swing joints, expansion joints, seismic joints, anchors, etc., as required to prevent excessive strains in the pipe work. All supports shall be installed to permit the materials to contract and expand freely without putting any strain or stress on any part of the system. Provide anchors as necessary.
- R. Equipment and Fixtures Furnished under other Sections: For rough-ins and connections to fixtures and equipment furnished under other sections, ascertain exact sizes, services and locations before starting work. Verify accuracy of work shown on drawings before starting work. Contractor is responsible for providing proper installation. Provide proper prevention on all hot and cold-water service.
- S. All piping shall be installed within designated finished and open ceiling heights as noted on the architectural drawings.
- T. Coordinate the installation of access panels with the equipment or valve being served. Valves and equipment located in ceiling spaces shall be accessible and located no more than 2'-0" above the access panel and within arm reach. Distances greater than 2'-0" only allowed when it is not possible to meet the 2'-0" requirement. Approval from the Owner's representative shall be obtained for such installations.
- U. Provide membrane clamping device for all piping drains and hose bibbs passing through any waterproof membrane.
- V. Powder actuated fastening systems will not be allowed. Embeds, beam clamps, or drilled fasteners will be required, unless otherwise noted. Earthquake bracing shall be required for all piping.
- W. All piping into stem walls and footings shall be double half lap wrapped with one-eighth inch ($\frac{1}{8}$ ") thick "Armaflex" insulation. The Contractor shall also provide blocked out areas in stem wall and footing as required for the installation of the piping. All piping shall avoid the lower eight inches (8") of the footing and the Contractor shall coordinate and provide dropped footings as required for the installation of the underground piping.
- X. All piping on roof shall be anchored to neoprene or close-cell polyethylene blocking with pipe straps. Blocking shall be set in mastic at 6'-0" on center.

- Y. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.
- Z. Provide pipe isolation for all piping through walls and floors. No piping shall have direct contact with walls, ceilings, floors, pipe supports, or hangers.

3.3 INSTALLATION OF UNDERGROUND GAS PIPING

- A. Underground polyethylene pipe and fittings shall be installed by personnel certified by the pipe manufacturer as having received instructions directly from the pipe manufacturer's field representative. Contractors not having certified personnel will be required to have a factory representative of the pipe manufacturer visit the site at the time of underground pipe installation and provide the required instructions. All required cost for training and certification shall be paid for by Contractor.
- B. Plastic pipe joints shall be made by the socket or butt heat fusion methods only and shall not be disturbed until they have properly set. Plastic pipe may not be joined by threaded joints, miter joints, or other mechanical joints.
- C. Plastic piping components are susceptible to damage by mishandling. Gouges, cuts, kinks or other forms of damage may cause -failure. Care shall be exercised during handling and installation to prevent any such damage. The Contractor shall inspect carefully all plastic pipe after each handling operation for cuts, gouges, deep scratches, or other imperfections that could adversely affect serviceability.
- D. Plastic pipe that has been damaged during the course of handling or installation shall be removed and replaced. The use of patching saddles, branch saddles, or band-type clamps for the repair of leaks in plastic pipe shall not be permitted. Sections of plastic pipe containing unacceptable defects shall be cut out and replaced with serviceable plastic pipe, using heat fusion fittings. All joints shall be made only by personnel who are qualified to make such connections, using heating and fusion joining tools that have been specifically approved.
- E. Plastic pipe shall be installed in such a way that shear or tensile stresses resulting construction, or other external loadings are eliminated.
- F. Always exercise care to protect the plastic materials from fire, excessive heat, or harmful chemicals. Thermoplastic pipe and fittings shall be protected from long-term exposure to direct sunlight.
- G. The piping shall be installed with sufficient slack to provide for possible contraction.
- H. Plastic pipe may be deflected per manufacturer's recommendations. Bends shall be free of buckles, cracks or other evidence of damage. Miter bends are not permitted.
- I. Where substructures cannot be avoided, by the use of smooth bends, the contractor shall make the necessary elevation changes or offsets using 45-degree socket fusion

elbows. A minimum separation of twelve inches (12") shall be maintained between the pipe and any other substructure unless the Inspector waives this requirement due to unusual circumstances which render it impractical.

- J. The Contractor shall take all reasonable steps during handling and installation in order to minimize the possibility of dirt or other foreign materials getting inside the pipe. Plastic pipe ends shall be kept closed when left in trench excavations or in work areas for overnight periods. Factory installed caps shall be left on plastic pipe until ready for immediate use.
- K. Pipe shall be installed with an electrically twelve (12) gauge solid copper tracer wire with black THNN insulation to provide a means of locating the pipe. The tracer wire shall be taped to pipe at intervals of not more than six feet (6'). Where the transition from steel to plastic occurs the tracer wire shall be securely brazed to the steel portion of the transition fitting. The tracer wire shall terminate above grade at each end. A tracer wire continuity check shall be completed by the contractor and approved by the inspector prior to the excavations.
- L. Control of static electricity during squeeze-off and purging operations: Friction induced static electricity can build up on any non-conductive surface, such as plastic pipe, creating the possibility of a spark discharge of sufficient energy to cause ignition of blowing natural gas if the proper air/gas mixture is present. A film of water on the surface of the pipe provides a conductive path to rapidly diffuse static electricity. All pipe in the work area which may be touched during purge or squeeze operations must be sprayed, doused with water, or kept wet by wiping it with a water saturated absorbent cloth. Leave the wet cloth wrapped around the pipe near the end of the opening. Where metallic pipe is involved, construction personnel shall wear dry gloves and take precautions to prevent any other part of the body from coming into contact with pipe, fittings, etc. to help ensure the prevention of accidental ignition of blowing gas.
- M. Upon completion of the gas piping underground installation, Contractor shall submit a written report directly to the Owner's Representative stating that all materials installed are as specified and approved, and that installation was done by factory certified tested to 60 psi.

3.4 PIPE JOINTS

- A. Ream pipe ends to remove burrs, inspect each length of pipe carefully and remove all obstructions prior to fabrication.
- B. Screwed Piping: Cut with machine cutter, hand pipe cutter or carborundum pipe wheel with file or scrapper or pipe reamer. Do not ream to exceed I.D. of pipe and thread to ANSI B2.1 requirements. Use Teflon tape on male thread prior to joining other services. No more than two full threads shall remain exposed after joining. Teflon tape shall not be used on steam trap piping.
- C. Copper Tubing: Cut square; remove burrs and clean pipe and inside of fitting to a bright finish with steel wool, wire brush, sandpaper or emery cloth. Apply solder flux

with brush to tubing. Remove internal parts of solder-end valves prior to soldering. Provide dielectric unions at points of connection of all copper tubing and any ferrous piping and equipment.

- D. Threaded Joints: Use threaded joints for natural gas pipes of size 2 inches and smaller. Where possible use pipe with factory-cut threads, otherwise cut pipe ends square, remove all fins and burrs, and cut taper pipe threads per ANSI B2.1. Threads shall be smooth, clean, and full cut. Apply thread tape to male threads only. Work piping into place without springing or forcing. Backing off to permit alignment of threaded joints will not be permitted. Engage threads so that not more than two threads remain exposed. Use unions for connections to valves for which a means of disconnection is not otherwise provided.
- E. Press Joints: Press Installation Training Requirement
 - 1. Installation training shall be provided on site by manufacturer personnel and documented with Engineer or safety director. Installation procedures, depth guides, and tool inspection shall be provided by manufacturer for all product types (steel or copper) for reference and safety assurance.
- F. Welded Joints: Use welded joints for natural gas piping of sizes larger than two inches and all fuel oil piping. Weld by the shielded metal-arc process using covered electrodes and in accordance with procedures established and qualified per ANSI B31.2. Each welder and welding operator shall be qualified for the ANSI procedures as evidenced by a copy of a certified ANSI B31.2 qualification test report. Contractor shall conduct the ANSI qualification test.

3.5 PIPE SUPPORTS

- A. Maximum hanger spacing and rod sizes for horizontal runs of piping shall be as noted in Table 3-1 & Table 3-2 of the California Plumbing Code.
- B. Every branch of piping over three feet (3') long shall have a separate hanger. Support at each horizontal branch connection. Provide at least one (1) hanger per branch.
- C. Support all suspended piping with clevis or trapeze hangers and rods.
- D. Hangers and supports shall be adequate to maintain alignment and prevent sagging and shall be placed within eighteen inches (18") of a joint. Support shall be provided at each horizontal branch connection. Hangers shall not be placed on joints. Make adequate provision to prevent shear or twisting of the pipe or joint.
- E. Support for cast iron no-hub pipes shall be adjacent to joint, not to exceed eighteen inches Provide hangers on the piping at each side of and within eighteen inches (18") of a no-hub pipe coupling so that the coupling will not bear any weight. Provide supports at every other joint, unless over four feet (4') then support on each side of the coupling within eighteen inches (18") of the joint. Hangers shall not be placed on the coupling. Provide hangers adequate to maintain alignment and prevent sagging of the pipe. Make adequate provision to prevent shear or twisting of the pipe or joint.

3.6 CLEANOUTS

- A. Size: Cleanouts of same nominal size as pipe they serve, except where they occur in piping four inches (4") and larger, in which case they shall be four inches (4") in size.
- B. Accessibility: Make all cleanouts accessible. Use graphite on all cleanouts with all threads being thoroughly greased after acceptable pressure test.
- C. Cleanouts Locations:
 - 1. Where indicated on drawings and as noted. Exact locations as directed by the Representative.
 - 2. At all horizontal offsets.
 - 3. At ends of or storm drain lines more than five feet (5') in length.
 - 4. At one-hundred feet (100') maximum intervals on all or drain horizontal runs within the building lines.
 - 5. At base of all soil/waste stacks and storm drain lines.
 - 6. For cleanouts in finished portions of building, locations subject to Owner Representative's approval before installation.
 - 7. Do not locate floor and wall in patient rooms, electrical rooms and elevator machine rooms.

3.7 ROOF OPENINGS

- A. Flash each pipe extending through roof with properly sized lead flashing assembly. Make watertight. Install vent caps on all vents through roof.

3.8 PLUMBING FIXTURES INSTALLATION

- A. Installation: Set Fixtures level and in proper alignment with respect to wall and floor, and setting of fixtures equally spaced. Install supplies in proper alignment with fixtures and with each other. Install flush valves in alignment with the fixture without vertical or horizontal offsets.
- B. Seals: Seal all wall and floor mounted fixtures watertight where fixture is in contact with wall or floors. Fill all cracks and open spaces between fixtures and wall or floor with non-elastomeric sealer. Seal fixtures to wall and floor surfaces with sealant as specified in Section 07 92 00, color to match fixture.
- C. Caulking: Caulk all deck mounted trim at the time of assembly, including fixture and casework mounted. Caulk all self-rimming sinks installed in casework.
- D. Trim: Make up trim with care and with the proper tools in order that no tool marks show after installation.

- E. Bolt carrier base supports to floor in accordance with manufacturer's installation instruction and recommendations.
- F. Water Closets and Urinals: Test and adjust all flush valves for water closets and urinals for proper flow. Bowls shall completely evacuate with a single flush. Splashing of water out of the bowl is not acceptable.
- G. Metered Faucets: Test and adjust all metered faucets for proper flow, duration of cycle.
- H. Extra Stock: Furnish special and other devices necessary for servicing plumbing fixtures and trim to Owner with receipt. Furnish one device for every ten (10) units.
- I. Installation of emergency safety equipment (emergency showers and eyewashes): Install emergency safety equipment in conformance with ANSI 2358.1-1998. Locate identification signs in accordance with this standard. Where shut-off valves are installed in the branch line leading to emergency safety equipment, the valves shall be indicating type (OS&Y or ball valve with lever handle), labeled for identification, and locked in the open position.

3.9 TESTING AND ADJUSTING

- A. Provide all equipment required for testing, including fittings for additional operating. Plumbing Inspector shall be present at time of testing.
- B. After the inspection has been approved or portions thereof, certify in writing the time, date, name and title of the person reviewing the test. This shall also include the description of what portion of the system has been approved.
- C. A complete record shall be maintained of all testing that has been approved and shall be made available at the job site.
- D. Upon completion of the work, all records and certifications approving testing requirements shall be submitted to the Owner's Representative before final payment is made.
- E. Defective work or material shall be replaced or repaired, as necessary, and the inspection and test repeated. Repairs shall be made with new materials. No caulking of screwed joints or holes will be acceptable.
- F. Protection: Isolate all equipment subject to damage from test pressure. Make no test against a service valve or meter.
- G. No part of any work shall be concealed or covered until after it is inspected, tested and approved by the Inspector. All piping for plumbing shall be completely installed and tested as required by the Plumbing Code. The test pressures indicated are a minimum only. All tests shall be as required by the governing authority as well.

- H. Sanitary Waste and Vent; Waste and Vent; and Drain Piping Systems: No-hub joints shall be tightened using a calibrated torque wrench. The water test shall be applied to the system either in its entirety or in sections. The piping shall be tightly plugged and submitted to a ten-foot (10') head (4.3 psi) of water located at the highest point. Provide a separate standpipe above the highest point being tested or extend the system to obtain the required ten-foot (10') head of water. The water shall be kept for at least thirty (30) minutes before the inspection starts. System shall hold water four (4) hours. Coordinate test tees with wall construction. Test tees shall not interfere with construction. Testing with compressed air or gas is not recommended.
- I. Domestic Water: Test the system with water at a hydrostatic pressure of not less than one hundred twenty-five (125) psi. Provide a pressure gauge located at the highest point of the system being tested, with a shutoff valve and bleeder valve so arranged to check gauge operation. When the piping system operates at higher pressure than seventy-five (75) psi, the hydrostatic test pressure shall be fifty (50) psi above the operating pressure. The test shall be applied not less than 1 hour prior to inspection of all joints. Where a portion of the water piping system is to be concealed before completion, this portion shall be tested separately as specified for the entire system. There shall be no drop at the end of four hours.
- J. Natural gas piping: For gas pressures up to 14 inches water column, the piping shall be subjected to an air pressure test of not less than ten (10) psi gauge pressure and shall be held for a length of time satisfactory to the Administrative Authority, but in no case less than four (4) hours. For gas pressures exceeding fourteen (14) inches water column and welded metal pipe, the test pressure shall be not less than sixty (60) psi gauge pressure and shall be continued for a length of time satisfactory to the Administrative Authority, but in no case for less than thirty (30) minutes. For underground gas pipe, the test pressure shall be not less sixty (60) psi gauge pressure and shall be continued for a length of time satisfactory to the Administrative Authority, but in case for less than four hours. Tests shall be made using air, CO₂, or nitrogen pressure only and shall be made in the presence of the Plumbing Inspector. Test gauges used in conducting tests shall comply with the Plumbing Code.
- K. Apply tests for a minimum period of four (4) hours or tests are complete.
- L. Work may be tested in sections, if necessary, for convenience. In this case, test of last section shall include connections between previously tested sections and section under test.
- M. Furnish all labor and all other utilities required to make tests. Make compliance tests in the presence of the Owner's Representative.
- N. Should any piece of equipment, apparatus, materials, or work fail in any of these tests, immediately remove and replace by perfect material, and retest the portion of the work replaced.

3.10 PIPE DISINFECTION AND CLEANING

- A. Supervision and Testing: Supervision and Testing: Perform disinfection under Plumbing Inspector's supervision. Disinfection shall be subject to written approval upon receipt of satisfactory laboratory test results.
- B. Contractor's Responsibility:
 - 1. Furnish labor, equipment, materials and transportation to disinfect domestic hot and cold-water systems and fire lines directly connected thereto, in conformity with procedures and standards described herein.
 - 2. Disinfect domestic hot and cold-water systems as required by the Public Health Department and all Authorities Having Jurisdiction.
 - 3. If no disinfection requirements are provided by the Authorities listed above, then disinfection shall conform to California Plumbing Code Sections 609.9.1 through 609.9.4.
- C. Preliminary Preparations:
 - 1. Service Cock: Provide within three feet (3') of the entrance of the supply main to the building, a three-fourths inch ($\frac{3}{4}$ ") service cock, or valve, for introducing the disinfecting agent into the lines.
 - 2. Flushing: After final pressure tests and before draining for disinfection, open each fixture or outlet until the water flow is clear.
- D. Standards Necessary for Approval:
 - 1. The water system shall have been uniformly chlorinated under the supervision of Plumbing Inspector.
 - 2. The results of water sample analysis shall be negative for the Aerogenes organisms, with a coliform MPN of less than 2.2 and a total plate count of less than 100 bacteria per milliliter.
 - 3. If the test for the bacteriological quality of the water in the system does not meet the standards, repeat the disinfection procedure until the specified standards are met.
- E. Final Approval: Health Department will give written approval for acceptance and use of the water system after the above procedures have been successfully completed and the standards met.
- F. Temporary hook-ups shall be disinfected. All fittings and piping in temporary systems are to be disinfected.
- G. Upon completion of the work, all records and certifications approving pipe disinfections shall be submitted to the Owner's Representative before final payment is made.

3.11 PROTECTION, CARE AND CLEANING

- A. Provide adequate means for, and fully protect, all finished parts of the materials and equipment against physical damage from whatever cause during the progress of this work and until completion.
- B. During construction, properly cap all lines and equipment nozzles so as to prevent of sand, dirt, etc. Protect equipment against moisture, plaster, cement, paint or other work of other trades by covering it with polyethylene sheets.
- C. Thoroughly clean exterior and interior of piping, equipment, and materials before systems are put into operation. All systems of any nature shall be thoroughly cleaned and flushed of all pipe contaminates such as cuttings, filings, lubricant, rust, scale, grease, solder, flux, welding residue, debris, etc. Any piece of equipment or part of any system which malfunctions or is damaged due to failure or neglect on the of this Division to observe this paragraph shall be repaired or replaced to the satisfaction of the Owner's by and at the total expense of this Contract.
- D. After completed installation, clean all systems.
 - 1. Piping, and Equipment, Non-insulated or to be insulated: Clean exterior thoroughly to remove most, plaster, cement, and dirt before insulation is applied.
 - 2. Piping and Equipment to Be Painted: Clean exterior of piping, and equipment, exposed in completed structure, removing rust, plaster, cement and dirt by wire brushing. Remove grease, oil, and similar materials by wiping with clean rags and suitable non-toxic solvents. Touch up primer coat as required.
 - 3. Motors, Pumps and Other Items with Factory Finish: Remove grease and oil and leave surfaces clean and polished.
 - 4. Plumbing Fixtures: Clean and polish fixtures immediately prior to final inspection of Owner Representative's occupancy. Clean floor drain grates, faucet aerators and outlets, check each fixture to insure against trap stoppage.
 - 5. Chrome or Nickel-Plated Work: Thoroughly polish.
 - 6. Factory Finished Items: Remove grease and oil and leave surfaces clean and polished.
- E. All code stamps and nameplates shall be protected from damage and must be clean and legible before final inspection.
- F. All piping shall be flushed out or blown out after pressure testing is complete and before being put into use. All strainer screens shall be removed and cleaned.

- G. After start-up and testing, strainer screens shall again be removed and cleaned.

3.12 PAINTING AND IDENTIFICATION

- A. After completion of hydrostatic tests, all system piping exposed to view in or on the building shall be painted in accordance with Section 09 91 00-Painting.
- B. Provide pipe, valve, and equipment identification, and signage in accordance with referenced standards, codes and specifications.

3.13 ACCESSIBILITY OF EQUIPMENT

- A. The installation of valves, thermometers, gages, traps, cleanouts, control devices or other specialties requiring reading, adjustment, inspection, repairs, removal or replacement shall be conveniently and accessibly located with reference to the finished building.

3.14 CLOSING IN OF UNINSPECTED WORK

- A. Do not allow or cause any to be covered up or enclosed until inspected, tested and approved.

3.15 EMERGENCY REPAIRS

- A. The Owner reserves the right to make temporary repairs as necessary to keep equipment in operating condition without voiding the guarantee bond or relieving the Contractor of their responsibility during the bonding period.

3.16 CLEAN UP AND REMOVAL OF SCRAP

- A. For work under all Mechanical Sections, trash and scrap shall be cleaned up and removed from the site as the work progresses.

3.17 PRELIMINARY OPERATIONS

- A. The Owner reserves the right to operate portions of the mechanical system on a preliminary basis without voiding the guarantee.

3.18 EXCAVATION AND TRENCHING: (As required for this section)

- A. Trenches for underground piping shall have uniform grades same as for pipe. Pipe shall be embedded in six inches (6") minimum layer of clean sand all around.
- B. Loose earth shall be tamped solid around sides and on top of sand-covered pipe and remainder thoroughly compacted to prevent settlement of the surface. After completion of backfill, the grade shall be finished to match the existing, or as directed. All paving and walkways shall be finished to match the existing.
- C. Provide and maintain dewatering pumps as required. After piping installation, it shall be inspected and approved by the Owner's Representative before Backfill shall not be

placed on or around piping for twenty-four (24) hours after pipe joints have been made and before lines are properly tested and approved.

- D. Provide barricades, signs, lanterns, shoring, sheeting and pumping as part of Work in this Division as required to insure safe conditions. Provide shoring and cross bracing of sufficient strength to properly support the walls of all excavations at depth of four feet (4') or more as required to protect personnel, and as required by OSHA.
- E. Minimum bury for piping exterior to the building shall be thirty-six inches (36") minimum cover from top of pipe to finished grade except as otherwise shown, or as determined by invert elevations. Contractor shall verify all piping elevations, and invert elevations before starting work.
- F. Excavation and pipe installation on public property shall be fully coordinated for timing and procedures with the authorities having jurisdiction. Work shall to all local Public Work rules and regulations. All paved areas and concrete sidewalks damaged during this work shall be repaired to match existing when new to the satisfaction of the governing authorities.
- G. Dispose of all surplus excavation material and seepage water as directed by general contractor and in accordance with local codes and applicable laws.
- H. Trees: When it is necessary to excavate adjacent to existing trees, the Contractor shall use all possible care to avoid injury to trees and roots. Where a ditching machine is run close to trees having roots smaller than two inches (2") in diameter, the wall of the trench adjacent to the trees shall be hand trimmed making clean cuts through the roots. All cuts through roots one-half inch and larger in diameter shall be painted with "Tree-Seal", or equal. Trenches adjacent to trees should be filled within twenty-four (24) hours after excavation, but where this is not possible, the side of the trench adjacent to the tree shall be kept shaded with burlap or canvas. Stockpiling of earth or building materials within the drip line of trees is prohibited. Where any roots two inches (2") and larger are encountered, the Contractor shall hand tunnel under root and protect it by burlap wrapping.
- I. Water piping shall not be run in the same trench with sewer or drainage piping unless separated as required by the plumbing code.
- J. Pitch: Horizontal sanitary and storm drain piping shall be installed at a uniform grade of not less than one-fourth inch per foot, unless otherwise indicated or directed.

3.19 BACKFILL

- A. Trenches: Do not place backfill in trenches until pipe installation has been reviewed and accepted by the Owner's Representative.
- B. Within twenty-four (24) hours or as soon as pipe has been laid and inspected, place in layers to the elevation at which excavation was begun, or to a height of six inches (6") from rocks or lumps greater than four inches (4") in any dimensions. Place in six-inch (6") layers and bring up evenly and tamp continually on both sides of pipe.

Use excavated materials or other approved materials as directed. Tamp by hand or with pneumatic tampers. Machine tamping and compaction by flooding or puddling will not be accepted.

- C. Compaction: Relative compaction of backfilling for pipe trenches and concrete structures shall be not less than 90 percent in accordance with Test Method No. Calif. 216 and ASTM D1557-58T. Fills below structures and the upper eighteen inches (18") of sub-grade beneath areas to be paved shall be compacted to 95%.
- D. Settling: which subsides or settles below finish grades or adjacent ground during warranty period shall be removed to top pipe and replaced with compacted fill as specified.

3.20 GUARANTEE

- A. At completion, furnish the Owner's Representative a written guarantee, in triplicate, that work has been performed in accordance with Drawings and Specifications and to replace or repair, to the satisfaction of the Owner's Representative any portion of the work that fails within the guarantee period after final acceptance provided such failure is due to Also agree to replace or repair, with like any part of the building or equipment installed by other trades but damaged by them in installing their work.
- B. During the guarantee period, make four (4) inspections of the work at six (6)-month intervals after final acceptance to check the performance of systems and correct any guaranteed items. Inspections to be made in the presence of the Owner's Representative.
- C. Guarantee in writing all plumbing work for a period of twenty-four (24) months following date of certificate of final acceptance.
- D. All apparatus shall be built and installed to deliver its full rated capacity at the efficiency for which it was designed.
- E. All plumbing and electrical apparatus shall operate at full capacity without objectionable noise or vibration.
- F. The plumbing systems shall provide the performance required at standard operating conditions.
- G. Where a manufacturer's guarantee exceeds one (1) year, the longer guarantee/warranty shall govern.

3.21 TRAINING

- A. Submit a written test schedule to the Owner's Representative for approval a minimum of three (3) weeks prior to proposed training dates.
- B. Provide three (3) sessions of two (2) hours each of instruction to the Owner regarding proper use and operation of the system. Submit a written course outline and a sample

of all manuals to be used two (2) weeks prior to the scheduling of the training. Training shall include both classroom and "hands-on" sessions and shall occur after final inspection and testing. Location and timing of the training session is to be arranged with the Owner's Representative.

- C. Two weeks prior to scheduled training dates, furnish the Owner's Representative with six (6) bound copies of complete instructions, including catalog cuts, diagrams, drawings, and other descriptive data covering the proper testing, and maintenance of each type of system installed, and the necessary information for ordering replacement parts. In addition, post one (1) copy of complete instructions at the control panel location.
- D. Session shall include detailed training and instructions covering the necessary and recommended testing, operating, and maintenance procedures for each type of system. Session shall include training and instructions covering the emergency operation procedures for type of system.
- E. Session shall include training and instructions covering the emergency operation procedures for each type of system.

END OF SECTION

Division 23:
HVAC

SECTION 23 05 00 - COMMON WORK RESULTS FOR HVAC

1.0 GENERAL

1.1 RELATED DOCUMENTS

- A. The General Conditions, Supplementary General Conditions, and Division 1 - General Requirements, are hereby made a part of this Section as if repeated herein.
- B. These General Mechanical Provisions apply to the entire Division 23.

1.2 DESCRIPTION

- A. Work Included: Furnish all labor, materials, equipment and pay all fees required to complete all HVAC work shown on the drawings and specified herein.
- B. Related work included in other sections:
 - 1. Electrical.
 - 2. Painting.
 - 3. Access Panels.
 - 4. Concrete Work.
 - 5. Landscape Irrigation.
 - 6. Site Work.

1.3 INCORPORATED DOCUMENTS

- A. Published specifications, standards, tests or recommended methods of trade, industry or governmental organizations apply to work of this Section, including those noted below:
 - 1. Associated Air Balance Council (AABC).
 - 2. American Gas Standard (AGA).
 - 3. Air Moving and Conditioning Association (AMCA).
 - 4. American National Standards Institute (ANSI).
 - 5. Adhesive and Sealant Council (ASC),
 - 6. American Society of Mechanical Engineers (ASME).
 - 7. American Society for Testing and Materials (ASTM).

8. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).
9. National Environmental Balancing Standards (NEBB)
10. National Electrical Manufacturers Association (NEMA).
11. National Fire Protection Association (NFPA).
12. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA).
13. Underwriters' Laboratories, Inc. (UL).
14. Air Moving and Conditioning Association (AMCA).
15. Air Diffusion Council (ADC).

1.4 LEGAL REQUIREMENTS AND STANDARDS

- A. General: Comply with applicable sections of state and local codes, laws ordinances, rules and regulations of authorities having jurisdiction.
- B. Codes and Standards: Conform to applicable sections of codes and standards, including:
 1. California Energy Conservation Code, Title 24.
 2. Occupational Safety and Health Administration (OSHA).
 3. State Fire Marshal requirements.
 4. California Electric Code (CEC).
 5. California Building Code (CBC).
 6. California Mechanical Code (CMC).
 7. California Plumbing Code (CPC).
- C. Minimum Requirements:
 1. Comply with requirements of authorities as minimum acceptable work.
 2. The drawings and specifications take precedence when they call for materials or construction of better quality or larger size than required by codes, laws, rules and regulations.

1.5 QUALITY ASSURANCE

A. Products Criteria:

1. Supply all equipment and accessories new, free from defects.
2. Supply all equipment and accessories in compliance with the applicable standards listed in Article 1.4 of this sections and with all applicable national, state, and local codes.
3. Electrical Equipment: Listed by UL and shall bear their label.
4. Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least 3 years. See other specification sections for any exceptions.
5. Products shall be supported by a service organization that maintains a complete inventory of repair parts and is located reasonably close to the site.
6. When two or more units of materials or equipment of the same type or class are required. These units shall be products of one manufacturer.
7. Manufacturers of equipment assemblies, which use components made by others, assume complete responsibility for the final assembled product.
8. Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous place on equipment, or name or trademark cast integrally with equipment, stamped or otherwise permanently marked on each item of equipment.
9. Asbestos products, equipment or materials containing asbestos shall not be used.
10. Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the Owner prior to installation. Installation of the item will not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

B. Qualifications of Installers: For the actual fabrication, installation and testing of work under this Section, use only thoroughly trained and experienced workmen completely familiar with the items required and the manufacturer' current recommended methods of installation.

C. Before any welding is performed, submit a copy of the Welding Procedure Specification (WPS) together with the Procedure Qualification Record as required by Section 9 of the ASME Boiler and Pressure Vessel Code.

1. Before any welder performs any welding, submit a copy of the Manufacturer's Record of Welder or Welding Operator Qualification Tests as

required by Section 9 of The ASME Boiler and Pressure Vessel Code. The letter or symbol (as shown on the qualification test form) shall be used to identify the work of that welder and shall be affixed in accordance with appropriate construction code, to each completed weld.

2. The types and extent of non-destructive examinations required for pipe welds are shown in Table 136.4 if the Code for Pressure Piping, ANSI/ASME.

D. Requirements of Regulatory Agencies and Standards:

1. Permits: All fees, permits and inspections are owner's responsibility. Deliver all certificates of inspection to Architect.
2. Arrange and pay all costs for utilities required to complete all work of this Division. Connection to all utility company or on-site services, payment of service charges and provision for and installation of temporary utilities is included.
3. The requirements of authorities shall be minimum acceptable requirements for the work. When contract drawings or specifications call for materials or construction of better quality for larger size than required by codes, laws, rules and regulations, the drawings and specifications take precedence.

E. Drawings:

1. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. All scaled and figured dimensions are approximate and are given for estimating purposes only. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices that may be required to complete the installation. Before proceeding with any work, carefully check and verify all dimensions and sizes.
2. As far as possible the work has been indicated on the drawings in such position as to suit and adapt to the work of other trades, but the work as indicated is largely diagrammatic and shown primarily for clarity. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the work of all other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown.
3. When apparatus and equipment have been indicated on the drawings, dimensions have been taken from typical equipment of the class indicated. The locations of apparatus, piping, and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

4. Where equipment is furnished by others, verify dimensions and the correct locations of this equipment before proceeding with the rough-in of connections.
5. Be responsible for any cooperative work which must be altered due to lack of proper supervision or failure to make proper provision in time. Such changes shall be directly supervised by the Architect and made to his satisfaction.
6. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for submittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

1.6 DEFINITIONS

- A. Exposed: Piping, ductwork, and equipment exposed to view in finished rooms, or completed work.
- B. Option or Optional: Contractor's choice of an alternate material or method.
- C. Install: To physically erect, mount and connect complete with related accessories.
- D. Supply: To purchase, procure, acquire and deliver complete with related accessories.
- E. Furnish or Provide: To supply, install, and connect up complete and ready for safe and regular operation of particular work referred to, unless specifically noted otherwise.
- F. Work: Labor, materials, equipment, apparatus, controls, accessories, and other items required for proper and complete installation.
- G. Wiring: Raceway, conduit, fittings, wire, boxes, and related items.
- H. Concealed: Embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces, or in enclosures, and not exposed to view in the completed work.
- I. Reviewed, Satisfactory, Accepted, or Directed: As reviewed, satisfactory, accepted or directed, by or to Engineer.
- J. Motor Controllers: Manual or magnetic starters (with or without switches), individual pushbuttons or hand (HOA) switches controlling the operation of motors.

- K. Control or Actuating Devices: Automatic sensing and switching devices such as thermostats, pressure, switches and relays, etc., controlling operation of equipment.
- L. Indicated, as Shown, or Noted: As indicated, shown or noted on Drawings or Specifications.
- M. Similar or Equal: Of base bid manufacturer, equal in materials, weight, size, design and efficiency of specified product.
- N. Engineer: Mechanical Engineer of Record.
- O. Accessible: Capable of being reached without the use of ladders, or without climbing or crawling under or over obstacles such as motors, fans, pumps, belt guards, transformers, high voltage lines, piping, and ductwork.

1.7 SITE EXAMINATION

- A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirement of the contract. Compare site and existing conditions to the mechanical, electrical, architectural, structural, civil, and other drawings and specifications. Call any discrepancies to the attention of the Architect during bidding period. Make allowances for them in preparing the bid.

1.8 ELECTRICAL WORK

- A. Quality: Work shall comply with requirements of Division 16 and applicable codes.
- B. Wiring: all wiring shall be in electrical conduit or as indicated on drawings.
- C. HVAC Control Wiring: Provide control wiring for starter holding coils, relays, interlock and temperature controls.
- D. Provide controls, controllers, relays, transformers, switches, time clocks, etc., required by work of this Division. Install duct mounted smoke detectors furnished by Fire Alarm products.

1.9 SUBSTITUTION OF MATERIALS:

- A. The design has been based on the manufacturer's name and product listed on the drawings or named first in these specifications. Other manufacturers' names or same manufacturer but different product line listed in these specifications may be selected and considered "as equal" for quality only; however, they must match the performance, construction, fit and features of those selected for design. The acceptance of these does not relieve the Contractor for responsibility of providing the required materials and providing a workable system.
 - 1. In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM,

NOT SUBMITTED”. Product data sheets for the corresponding proposed substitution item shall be clearly labeled “PROPOSED SUBSTITUTION”.

2. It shall be the Contractor’s responsibility to provide enough information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be accepted, and the submittal will not be allowed.

B. Should the contractor wish to substitute equipment or material other than those considered for the basis of design, the contractor shall submit information as called for in “Submittal of Materials and Equipment” for both the specified or scheduled item and the substitute item. These submittals will show that both the specified and the substitute material match in quality, performance, construction, fit and features of those selected for design. Any equipment or material submitted for substitution without the comparison information will not be reviewed or acceptable.

C. Liability of Substitutions:

1. Performance of substitutions must be equal to the item specified. If the substituted item fails to perform according to the specifications, replace with the originally specified item without extra compensation on request of the Architect any time within the guarantee period.
2. The contractor is responsible for the cost of any changes to other trades and additional Architectural and Consulting fees resulting from approved substitutions in mechanical equipment.
3. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
4. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.

1.10 SUBMITTAL OF MATERIALS AND EQUIPMENT

A. Submittal:

1. Submittals for a product or material or area of work must be complete. **PIECEMEAL SUBMITTAL WILL NOT BE ACCEPTABLE.** All

submittals shall be factory or manufacturer certified. Vendor's submittal data not acceptable.

2. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.
 - a. Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
 - b. Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.
 3. Identify submittal with Architect's project name, number and with item designation as indicated on drawings, and referenced to applicable paragraphs of the specification. Submit in brochure form.
- B. Review of Submittal: These will be reviewed for general design only, and not for method of assembly, erection, construction, or detailed compliance with contract documents. All submittals shall be factory or manufacturer certified. Submittal technical data and dimensions by Vendor are not acceptable.
- C. Manufacturer's Data:
1. Include data for all material and equipment that will be installed.
 2. Include complete catalog information such as construction, capacities, types, fan curves, pump curves, sizes, etc. Also include dimensional data, and sufficient information to illustrate compliance with the specifications and list labeling and/or approving agencies and standards of design employed in manufacturer data.
- D. Shop Drawings:
1. Prepare dimensionally accurate floor plans and Sections in tight conditions as required of all equipment rooms and all floor plans. Show all equipment, complete ductwork, piping (including plumbing and sprinkler pipes), accessories, and also clearances for operating servicing and coordination with other systems. Indicate bottom elevation for both pipes and ductwork.
 2. Automatic temperature control systems, wiring diagrams, control panel boards. Include in wiring diagrams all low and line voltage wiring and equipment.
 3. Drawings clearly identified with the Architect's project name and number, and a sheet title identifying its contents.
 4. Show location of thermostat(s) and sensors.

1.11 SHOP, OFFICE AND STORAGE

- A. Provide temporary shop, office and storage space on site only at locations approved by Architect, as required for execution of work. Remove these facilities upon completion of work.

1.12 JOB CONDITIONS

- A. Where new pipes are to be connected to an existing pipe, verify location, size, elevation and all other information necessary for connection. This verification shall be done prior to installation of the new pipe. Should there be a problem, contact the Architect immediately to resolve the problem.
- B. Interruption of Services:
 - 1. Before making any connections or doing any work which interrupts services to existing buildings, notify Owner in writing at least 72 hours in advance; and such work performed as quickly as possible and only at such times as designated by Owner.
 - 2. Length of time existing services is shutdown to be approved by Owner.
- C. Restoration of Damage: Repair or replace, as directed by Architect, materials and parts of premises which become damaged because of installation of work of this Division. Remove replaced parts from premises. Keep accumulation of dust and debris to a minimum. Remove and dispose of debris in a legal manner. Burning and/or selling material at the site is prohibited.
- D. Storing Mechanical material in Premises:
 - 1. Duct and mechanical equipment on site must be covered before installation.
- E. Cleaning Equipment and Premises:
 - 1. Clean equipment and materials: Remove all dirt, grease, splashed paint, plaster and similar foreign materials. Restore damaged finishes to original condition.
 - 2. Site Cleaning: Remove from site all packing cartons, scrap materials and other rubbish resulting from operations.

1.13 REVIEW OF CONSTRUCTION

- A. Work may be reviewed at any time by representatives of Owner or representatives of Architect.
- B. Advise Architect that work is ready for review at following times:
 - 1. Prior to backfilling buried work.
 - 2. Prior to concealment of contract have been completed.

3. When requirements of contract have been completed.
 4. Do not backfill or conceal work without Architect's consent.
- C. Maintain on job a set of specifications and drawings for use by Architect's representative.
- D. Noncompliance: Should any of the work be covered up or enclosed prior to all required inspections and approvals, uncover the work as required and, after it has been completely inspected and approved, make all repairs and replacements with such materials as are necessary to the approval of the Architect and at no additional cost to the Owner.

1.14 MATERIALS

- A. In addition to material and equipment specified, also provide incidental materials required to effect complete installation. Such incidental materials and equipment shall be uniform throughout the installation. Equipment or fixtures of the same type shall be of same manufacturer.
- B. Protection of Materials:
1. Protect materials, equipment and apparatus provided under this Division from damage, water, dust, or similar impairment, both in storage and installation until Notice of Completion has been filed. Materials, equipment or apparatus damaged because of improper storage or protection will be rejected and must be removed from the site.
 2. Cap openings in pipes and ends of valves with manufactured caps and fittings. Do not use taped caps.
 3. Protect premises and work of other Divisions from damage arising out of installation of work of this Division.

1.15 TESTING

- A. Provide tests specified hereinafter, where applicable. Provide written verification that the tests have been successfully completed.

1.16 RECORD DRAWINGS (AS-BUILT DRAWINGS)

- A. Contractor shall provide and keep up-to-date a complete and accurate "as-built" record set of blue line prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. This record shall be kept up-to-date on blue line prints as the job progresses and shall be available for inspection at all times. Submit completed drawings to Architect in compliance with Division 1.

- B. Include on as-built drawings:
1. Main shut-off valves, plainly marked and identified.
 2. Position of all buried or concealed mains accurately dimensioned, both horizontally and vertically.
 3. Changes in location of piping, duct or equipment from construction documents. Bottom elevations of each duct and pipe.
 4. Ceiling and duct access panel locations.
 5. Location of temperature control devices including static pressure control probe, stats, selected zones, etc.
 6. Location of all equipment.
 7. Invert elevation of sewer and storm drain pipe below grade.

1.17 OPERATING AND MAINTENANCE DATA

- A. General: Submit to the Architect before acceptance of the installation, complete and at one time. Partial or separate data will not be accepted. Data shall consist of the following minimum submissions:
1. Piping Identification Schedule: Copy of charts as specified under valve tags and charts.
 2. Simplified and consolidated control drawings.
 3. Equipment: List of nameplates, including nameplate data and system served.
 4. Manufacturer's Literature: 3 copies of manufacturer's instructions for operation and maintenance of all mechanical equipment, including replacement parts list.
 5. Written Instructions: Typewritten instructions for operation and maintenance of these systems composed of Operating Instructions and Maintenance Schedule. 4 copies submitted to the Engineer for approval.
 6. Operating Instructions: A brief description of the system indicating proper setting of switches and other equipment furnished for providing control of the system and its components by the operator. Do not include adjustments requiring the technical knowledge of the service agency personnel.
 7. Maintenance Instructions: A list of each item of equipment requiring inspection or lubrication, describing the performance of such maintenance, and the month of the year when each item of equipment should be inspected, serviced, or lubricated.

8. Maintenance Schedule: A list of each item of equipment requiring maintenance, showing the exact type of bearing on every component of each item of equipment, and the frequency when each item of equipment should be inspected or serviced.
9. Verbal Instructions: Upon completion of the work, and at a time designated by the Architect, instruct the Owner's representative in the operation and maintenance of the equipment supplied by his company.
10. Binders: Four complete sets of the above data in loose ring binders with permanent covers, with permanent identification on back and index.

1.18 COMPLETION

- A. Before Final Review: The work hereunder will not be reviewed for final acceptance until Operating and Maintenance Data, Manufacturer's Literature, Valve Directories, Piping Identification Code Directory and nameplates specified herein have been approved and properly posted in the building and final cleaning has been completed.
- B. Demonstration of Operations: When the installation is complete and adjustments specified herein have been made, operate the systems for one week, during which time demonstrate to the Architect that systems are completed and operating in conformance with these specifications.

1.19 GUARANTEE

- A. General: Conform to the GENERAL CONDITIONS of the specifications.
- B. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (2) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.
- C. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of two (2) years after date of acceptance of his work.
- D. Parts Warranty: Provide standard warranty of manufacturer for replacement of parts to apply after expiration of above period. Furnish replacement parts to Owner or to his service agency as directed. Furnish Owner printed manufacturer's warranties' complete with material included and expiration dates upon completion of project.
- E. Warranty also applies to services including instructions, adjusting, testing, noise, balancing, etc.

2.0 PRODUCTS

2.1 GENERAL

- A. Beyond material and equipment specified, also provide incidental materials required to effect complete installation. Such incidental materials include solders, tapes, caulking, mastic, gaskets, and similar items.
- B. Materials and equipment shall be uniform throughout the installation. Equipment of the same type shall be of same manufacturer.
- C. Products from other manufacturers not listed shall submit specifically in accordance with Specification Section 01630 – Product Substitution Procedures.

2.2 VALVES

- A. General - Provide valves with features indicated and where not otherwise indicated, provide proper valve features as outlined in this specification. Comply with ANSI B31.1.
 - 1. Flanged - Valve flanged complying with ANSI B16.1 (cast iron), ANSI B16.5 (steel), or ANSI B16.24 (bronze).
 - 2. Threaded - Valve Ends complying with ANSI B2.1.
 - 3. Butt-Weld - Valve Ends complying with ANSI B16.25.
 - 4. Solder Joint - Valve Ends complying with ANSI B16.18.
 - 5. Flangeless - Valve bodies manufactured to fit between flanges complying with ANSI B16.1 (cast iron), ANSI B16.5 (steel), or ANSI B16.24 (bronze).
 - 6. Extent of valves required by this section is indicated on drawings and/or specified in other Division 23 sections.
- B. Valve Tags and Lists:
 - 1. HVAC: Provide for all valves.
 - 2. Valve Tags: Engraved black filled numbers and letters not less than ½ inch high for number designation, and not less than 1/4 inch for service designation on 19 gauge 1½ inches round brass disc, attached with brass “S” hook or brass chain.
 - 3. Valve Lists: Typed or printed plastic-coated card(s), sized 8½ x 11 inches showing tag number, valve function and area of control, for each service or system. Punch sheets for a 3-ring notebook.
- C. Valve Types - Provide valve of same type by same manufacturer.
- D. Ball Valves
 - 1. Comply with the following standards:
 - a. Ball Valves: MSS SP – 110

E. Swing Check Valves

1. General - Construct pressure containing parts of valves as follows:
 - a. Bronze Valves: 125 or 150 psig: ANSI/ASTM B 62.
 - b. Iron Body Valves: ANSI/ASTM A-126, Grade B.
2. Comply with the following standards for design, workmanship, material and testing:
 - a. Bronze Valves: MSS SP – 80
 - b. Cast Iron Valves: MSS SP – 71

F. Water Check Valves

1. General - Provide water style, butterfly type, spring actuated check valves conforming to ANSI/ASTM A 126, grade B.

2.3 HANGERS AND SUPPORTS

- A. All required seismic bracing shall be installed as per Title 24, Part 2, 2016 CBC for total lateral forces prescribed in ASCE 7 Section 13.3 as defined in ASCE 7-10.
- B. Installation shall be as published by SMACNA or OSHPD anchorage pre-approved restraint system. All hanger material to be electroplated zinc or hot-dipped galvanized. No plain (black) finish allowed.
- C. Trapeze suspension (trapeze hangers may be used for parallel lines if pipes pitch same direction): Size channel assembly in accordance with manufacturer’s published load ratings. No deflections shall exceed 1/360 of span (refer to Superstrut load tables).
- D. Support and laterally brace all ducts, pipes, and equipment per latest SMACNA Manual Standards.
- E. Do not support weight of piping from mechanical equipment, i.e., coil connections.
- F. Do not cut or weld to any structural steel without permission of Architect.
- G. Provide Semco, Trisolator, or equal pipe isolator at all hangers for non-insulated pipes.
- H. Schedule of hangers and supports:

INDIVIDUAL PIPE HANGERS		
Pipe Size - inches	Hanger	Minimum Rod Size - inches
½" thru 2"	Superstrut C711	3/8"
2½" thru 3"	Superstrut C711	½"
4" and 5"	Superstrut C711	5/8"
6"	Superstrut C711	¾"
8"	Superstrut C711	7/8"

TRAPEZE HANGERS	
Single or Double 12 Gauge Channel	Superstrut A1200 or A1202
Straps	Superstrut 70 or 702 series
Pipe Isolators	Superstrut 1-716 Cush-A-Clamp

WALL SUPPORT	
Individual pipe sizes up to 3"	Superstrut S250
Individual pipe sizes 4" thru 8"	Superstrut S251

2.4 ROOF, WALL AND FLOOR PENETRATIONS

A. All pipe penetration through poured concrete wall or floor shall be sealed with Metra-seal as shown on drawings. All other pipe penetration holes shall be sealed with a product that will seal against the spread of flame, smoke, gases and water, for up to a 3-hour rating. Product shall be as manufactured by 3M Brand (Fire Barrier Penetration Sealing Systems) or equal. Product must have been tested and classified by Underwriters' Laboratories and listed in the UL Building Materials Directory; "Through-Penetration Fire stop Systems (XHEZ)," and "Fill, Void or Cavity Materials (XHHW)." Submittal shall reflect product and manufacturers Spec-Data sheet reflecting approvals.

B. Provide pipe sleeves as follows:

SLEEVE LOCATION	SLEEVE MATERIAL
Floor membrane waterproof	Duco cast iron body with floor and roof construction flashing device, under deck clamp as required, J.R. Smith 1720 or approved equal. Non membrane floor and Standard weight black steel exterior wall pipe with a continuously welded water stop of 1/4" steel plate extending from outside of sleeve a minimum of 2" all around.
Non membrane floor and continuously exterior wall construction.	Standard weight black steel pipe with a welded water stop from outside of a sleeve, a minimum of 2" all around

C. Length of sleeves as follows:

SLEEVE LOCATION	SLEEVE LENGTH
Floors	Equal to depth of floor construction including finish. Extend minimum 2" above floor level in unfinished area, and in pipe chases.

D. Escutcheons: Provide 1" wide chrome or nickel-plated plates on all pipes exposed to view, passing through floors, walls, partitions, etc. Escutcheons sized to fit pipe and pipe covering and give a finished appearance. Escutcheons held in place by set screws. Provide plates on pipes extending through sleeves.

2.5 ACCESS DOORS

- A. Furnished and installed under this Division.
- B. Install where shown or required by regulatory agencies and for access to all concealed valves, actuators, fire dampers, volume dampers, motors, equipment, etc.
- C. Access doors to be fire rated to match fire rating of wall or ceiling where door is to be installed.
- D. All doors shall have key operated lock.
- E. Door sizes shall be 24" x 24" minimum for ceilings and 12" x 12" minimum for walls.
- F. Non-rated door: 16 gauge frames, 14 gauge steel door, flange of door shall be 3/4" wide, hinge shall be concealed, continuous piano hinge, key operated cylinder lock, finish shall be prime coat of rust inhibitive grey baked enamel.
- G. Karp Model DSC-214M drywall type with key operated cylinder lock and tile with exact fit. Finish shall be prime coat of rust inhibitive grey baked enamel.
- H. Karp Model KDW for gypsum drywall with key operated cylinder lock and tile with exact fit. Finish shall be prime coat of rust inhibitive grey baked enamel.
- I. Fire rated doors: UL rated for 1½ hour, "B" level in walls and by Warnock Hersey for 3 hours in ceilings. 16-gauge frame, 20-gauge steel, welded pan type door, flange of door shall be 1" wide, 16 gauge steel, hinge shall be continuous, door shall be filled with 2" thick fire rated insulation, bolt type key operated latch, finish shall be prime coat of rust inhibitive grey baked enamel. Karp Model KRP-150FR
- J. Coordinate all locations with Architect and other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

2.6 SEISMIC RESTRAINTS

- A. General Requirements: Seismic restraints shall be provided for all vibration isolated equipment, both supported and suspended, and all vibration isolated piping.
- B. Where anchorage details are not shown on the drawings, the field installation shall be subject to the approval of the mechanical engineer and the project inspector.
- C. All mechanical equipment shall be braced or anchorage to resist horizontal force acting in any direction using the following criteria:

1. The total design lateral seismic force shall be determined from ASCE 7 Section 13.3.1, California Building Code (CBC) 2016. Forces shall be applied in their horizontal directions, which result in the most critical loadings for design. The value of a_p (component amplification factor) and R_p (component of modification factor) of Section 13.3.1 shall be selected from Table 13.6-1, ASCE 7. The value of I_p (seismic importance factor) and S_{DS} (special acceleration) shall be selected from Section 13.1.3 and Section 11.4.4, ASCE 7, respectively.

D. For Supported Equipment:

1. Pre-approved isolator restraint system by the State of California OSHPD and bear approval number.
2. Submittal shall include load versus deflection curves up to 1/2" in the x, y, and z planes. Tests shall be conducted in an independent laboratory or under the signed supervision of an independent registered engineer. The snubber assemblies shall be bolted to the test machine as the snubber is normally installed. Test reports shall certify that neither the bridge bearing neoprene elements nor the snubber body has sustained any obvious deformation after release from the load.
3. Submit calculations for each seismic restraint and vibration isolation signed by structural Registered Engineer.

E. Seismic Restraint Systems for Ductwork and Piping:

1. Piping, ductwork, and electrical distribution systems shall be braced to comply with the forces and displacements prescribed in ASCE 7-10 Section 13.3 as defined in ASCE 7-10 Section 13.6.8, 13.6.7, 13.6.5.6, and 2016 CBC Section 1616A.1.23, 16A.1.24, 1616A.1.25 and 1616A.1.26.
2. The bracing and attachments to the structure shall be detailed on the approved drawings or they shall comply with one of the OSHPD pre-approval of manufacturer's certifications (OPM) as modified to satisfy anchorage requirements of ACI 318-14 Chapter 17.
3. Copies of the OPM manual(s) shall be on the jobsite prior to the start of hanging and bracing of the ductwork and pipe distribution systems.

2.7 IDENTIFICATIONS

A. Piping:

1. Identify all piping with Brady Perma-Code, Stenton, or approved equal, self-sticking pipe markers consisting of pipe content wording and arrow indicating directions of flow on A.S.A. color background.

2. Arrow and wording are two separate markers which shall be placed immediately adjacent to each other.
3. Markers to be 50 feet apart (maximum) on centers and shall occur where a pipe enters and leaves a concealed space.
4. Use 2" high letter size for pipe or insulation 3" or larger, and 1" size for pipe or insulation 2½" or smaller.
5. Provide at each end of each marker Brady or equal 2¼" wide self-sticking clear tape around the periphery of pipe or insulation to further secure the marker.
6. All markers shall be installed after finish painting is complete.

B. Piping Label Colors:

SERVICE	BACKGROUND COLOR	LETTER COLORS
Refrigerant (410A)	Mauve	Black

- C. Equipment: Each piece of motor-driven equipment shall be identified by engraved plastic-laminate signs. Signs shall be a minimum of 4½" x 1½" with minimum of ½" high white letters on a black background, mounted permanently on equipment. The names shall correspond to those given on the control panels be identified as to the area or space served by the equipment. Automatically started motors shall have warning sign: "THIS MOTOR MAY START AT ANY TIME." The equipment shall be further identified with the electrical panel and circuit.
- D. Valves: All valves shall have 1-½" diameter brass disc stamped with 3/8" high letters showing type of services and valve number. Tags shall be attached to valves with brass chain.

3.0 EXECUTION

3.1 REVIEW OF CONSTRUCTION

- A. Work may be reviewed any time by representative of Architect.
- B. Advise Architect that work is ready for review at following times:
 1. Before concealment of work in walls and above ceilings.
 2. When requirements of Contract have been completed.
- C. Do not conceal work without Architect's consent.
- D. Maintain on project site a set of specifications and drawings for use by Architect's representative.

3.2 NOISE AND VIBRATION

- A. Correct conditions at no cost to the Owner if noise or vibrations because of improper material or installation occurs in the building.

3.3 GENERAL INSTALLATION METHODS

- A. Where pipe passes through seismic joint, install flexible connection as manufactured by Metraflex to allow vertical and horizontal movement during an earthquake.
- B. Carpentry, Cutting, Patching and Core Drilling:
 - 1. Provide carpentry, cutting, patching, and core drilling required for installation of material and equipment specified in this Division.
 - 2. Do not cut, core or drill structural members without consent of Architect.
 - 3. All asphalt and concrete sawing shall not have any outside corners cut.
- C. Waterproof Construction:
 - 1. Maintain waterproof integrity of penetration of materials intended to be waterproof. Caulk penetrations of foundation walls and floors watertight. Provide membrane clamps at penetrations of waterproof membranes.
 - 2. Provide weatherproof NEMA 3R enclosures for all equipment or devices mounted outside or otherwise exposed to the weather.
- D. Sleeves, Chases, and Concrete Inserts:
 - 1. Provide all required sleeves, chases, concrete inserts, anchor bolts, etc., and be responsible for correct location, installation of same.
 - 2. Sleeves and chases are prohibited in structural members, except where approved in writing.
 - 3. Locating and sizing of openings for ductwork through walls, etc., under this Division.
 - 4. Provide sleeves for each pipe passing through walls, partitions, floors and roofs.
 - 5. Set all pipe sleeves and inserts in place before concrete is poured. Coordinate the placing of these items to avoid delaying concrete placing operations.
 - 6. Locate all chases, shafts, and openings required for the installation of the mechanical work during framing of the structure. Do any additional cutting and boring required due to improperly located or omitted openings without cost of the Owner under the supervision of the Architect.

7. Sleeves for un-insulated pipe shall be two pipe sizes larger than pipe passing through or a minimum of 1/2" clearance between inside of sleeve and outside of pipe.
8. Sleeves for insulated piping of adequate size to accommodate the full thickness of pipe covering with clearance for packing and caulking.
9. Caulk space between sleeve and pipe or pipe covering with an incombustible, permanently plastic, water-proof non-staining compound leaving a finished, smooth appearance or pack with incombustible fibrous glass to within 1/2" of both wall faces and provide plastic, water-proof caulking compound.
10. Finish and Plates: Smooth up rough edges around sleeve with plaster.

E. Mechanical Equipment:

1. Where not otherwise indicated, basis for equipment and material installation is published recommendations of respective manufacturer.
2. Equipment:
 - a. Accurately set and level with supports neatly placed and properly fastened. No allowance of any kind will be made for negligence on part of Contractor to foresee means of bringing in, installing equipment into position inside building.
 - b. All equipment shall be installed accessible on all sides with operable areas having a minimum space clearance as recommended by the manufacturer.
 - c. Where the School District determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, equipment shall be removed, and reinstalled or remedial action performed as directed at no additional cost to the Owner.

F. Piping and/or Ductwork Systems:

1. Work into complete integrated arrangement, with like elements to make work neat appearing finish.
2. Run concealed, except as shown otherwise.
3. Exposed pipes and ductwork to run parallel with walls or structural element. Do not install any exposed pipe or ductwork without prior approval of Architect.
4. Install with adequate passageways free from obstructions, as high as practicable to maintain adequate head room, as shown or as required. Coordinate with work of other Divisions to achieve proper head room as specified in this Division.
5. Clearance: Do not obstruct spaces required by code in front of electrical equipment, access doors, etc.

3.4 TESTING AND ADJUSTING

- A. General: All defects disclosed as result of the following or other tests or operations shall be promptly repaired by and at expense of Contractor and to Architect's satisfaction. Test shall comply with all necessary codes, rules, and regulations as noted herein before. Contractor shall supply all instruments, labor and tools required by tests. Any defective material and/or equipment shall be repaired, adjusted and replace by new, like materials and equipment, and retested before acceptance.
- B. Clean and purge equipment and piping before each test.
- C. Test various mechanical systems in portions as work progresses. Any system or portion previously tested to become part of any repeated test when it becomes part of distribution or collection system.
- D. Maintain test pressures for periods stated, or as directed, without loss in pressure except that due to change in temperature or authorities having jurisdiction.
- E. Operational Tests: Operational tests shall be made on all machinery and devices to determine proper compliance with specifications. All equipment shall function quietly and efficiently; any undue noise or vibration caused by malfunctioning of piping and equipment shall be promptly repaired and/or corrected before acceptance.
- F. Timing of Tests: Two weeks before expected completion date, the Contractor shall put all systems and equipment into operation and shall continue operation of same during each working day, but not less than five 8-hour periods, until all adjusting, balancing, testing, demonstrations, instructions and cleaning of systems have been completed. Instructions and demonstrations required shall be given simultaneously with this operation.
- G. Duct Leakage Tests: All ductwork with 2" W.C. or higher static pressure shall be tested for leaks, using necessary instruments. Conduct tests as recommended in SMACNA balancing manual. Ductwork handling air pressure less than 2" W.C static pressure shall be sealed wherever visible or tactile observations reveal leakage.
- H. After completion of testing and adjustment, operate the different systems and equipment under normal working conditions for two days and show specified performance. If, in the opinion of the Architect, performance of equipment or systems is not according to specifications or submitted data, alter or replace equipment at no increase in contract sum. Contractor, at his option, may order tests from an independent approved laboratory to prove compliance. All such tests shall be at no increase in contract sum.

3.5 INSTALLATION OF PIPING AND EQUIPMENT

- A. Closing-In of un-inspected Work: Do not allow or cause any of the work to be covered up or enclosed until it has been inspected, tested, and approved by the Architect. Any work enclosed or covered prior to such inspection and test shall be uncovered and, after it has been inspected, tested, and approved, make all repairs with such materials as may

be necessary to restore all work, including that of other trades, to its original and proper condition.

- B. Before laying of any pipe or digging of any trenches, Contractor shall determine by actual excavation and measurement exact locations and depth of existing utility and service lines to which he is going to connect. In event depth of existing sewer main or storm drain is not sufficient to permit installation of piping as detailed on drawings or to make connection in manner indicated; Contractor shall confer with the Architect, Owner's representative and Engineer for Direction.
- C. Conceal all piping within finished rooms, unless otherwise noted on drawings.
- D. Cut pipe accurately to measurements established at the building; work into place without springing or forcing; properly clear all windows, doors and other openings. Excessive cutting or other weakening of the building structure to facilitate piping installation will not be permitted.
- E. Make all changes in direction with fittings and changes in main sizes through eccentric reducing fittings. Unless otherwise noted, install water supply and return piping with straight side of eccentric fittings at top of pipe.
- F. Provide sufficient swing joints, ball joints, expansion loops, and devices necessary for a flexible piping system.
- G. Provide union and isolating valves on piping at all equipment or apparatus. Locate valves so that the equipment can be removed without dismantling any branch lines.
- H. Install drain valves at all low points of each system to enable complete drainage, and air vents at all high points in the piping system to enable complete air venting. Install automatic air vent at all high points in the main piping systems.
- I. Support piping independently at pumps, coils, tanks, and the like so that its weight will not be supported by the equipment.
- J. Pipe all drains from pump glands, drip pans, relief valves, air vents, etc., to spill over an open sight drain, floor drain or other acceptable discharge points, and terminate with a plain end unthreaded pipe, 2" above the drain.
- K. Securely bolt in place to building structures, all equipment, isolators, hangers, etc.
- L. Pitch pipe line as required for proper drainage and elimination of air.
- M. Wire for hanging or strapping pipes not permitted.
- N. Support each run of piping independently from all other piping.
- O. Install spring vibration isolation in mechanical rooms and penthouse for all pipes' elbows and also within 40 feet of pipe length.
- P. Equipment Access

1. Install all piping, equipment and accessories to permit access for maintenance. Relocate piping, equipment and accessories required to provide maintenance access at no additional cost.
 2. Furnish access doors where any valves and equipment requiring access for servicing, repairs or maintenance located in walls, chases or above ceilings. Coordinate the location of access doors with and install by the applicable Contractor installing walls or ceilings.
- Q. Install gauges, thermometers, valves and other devices with due regard for ease in reading or operating and maintaining said devices. Locate and position thermometers and gauges to be easily read by operator or staff standing on floor or walkway provided. Servicing shall not require dismantling adjacent equipment or pipe work.

3.6 PIPE JOINTS

A. Copper Tubing:

1. Cut square, remove burrs and clean pipe and inside of female fitting to a bright finish with steel wool, wire brush, sandpaper or emery cloths. Apply solder flux with brush to tubing. Remove internal parts of solder-end valves prior to soldering.
2. Provide dielectric unions at points of connection of all copper tubing and any ferrous piping and equipment.
3. Joining of Copper Pipes:
 - a. Piping 1 1/2" and smaller: 95-5 solder
 - b. Piping larger than 1-1/2": Sil-Fos brazing 1000°F minimum.
 - c. All solder shall be lead free.

3.7 HANGERS AND SUPPORTS:

A. Piping:

1. Space hangers and supports for horizontal copper tubing according to the following schedule:

TUBE SIZE - inches	MAXIMUM SPACING
1" and smaller	6 feet on center
1 1/4" and 1 1/2"	7 feet on center
2" and 2 1/2"	8 feet on center
3" and larger	10 feet on center

2. Space hangers and supports for horizontal iron pipes according to the following schedule:

PIPE SIZE - inches	MAXIMUM SPACING
1 1/4" and smaller	8 feet on center

PIPE SIZE - inches	MAXIMUM SPACING
1½" thru 3"	10 feet on center
4" and larger	14 feet on center
All cast iron	5 feet on center*

a. * Locate hangers within 18" of each joint per Uniform Building Code.

3. Safety Hanger Wires:

- a. For air diffusers and other mechanical units to be mounted on suspended-grid ceiling systems and weighing less than 20 pounds may be supported directly on the runners of a heavy duty grid system but, in addition, they must have a minimum of two (2) #12 gage slack safety wires attached to the fixture at diagonal corners and anchored to the structure above.
- b. In advance of ceiling hanger-wire work, provide to job site layouts and/or instruction necessary for proper installation of safety wires.
- c. Connect safety wires to mechanical diffusers and equipment.
- d. For diffusers and equipment units weighing 20 pounds or more must be independently supported by not less than four (4) taut #12 gage wires, each attached to the fixture and to the structure above. The four (4) taut #12 gage wires, including their attachment to the structure above, must be capable of supporting four (4) times the weight of the unit.

3.8 VIBRATION ISOLATION

- A. The entire system, including equipment, air ducts, pipes, motors, and all other parts must be noiseless and free of vibration transmission.
- B. The Contractor shall not install any equipment or pipe which makes rigid contact with the "building" unless it is approved in this specification or by the Architect. "Building" includes slabs, beams, studs, walls, lath, etc.
- C. The installation or use of vibration isolators must not cause any change of position of equipment or piping which would result in stresses in piping connections or misalignment of shafts or bearings. In order to meet this objective, equipment and piping shall be maintained in a rigid position during installation. The load shall not be transferred to the isolator until the installation is complete and under full operational load.
- D. The Contractor shall correct, at no additional cost, all installations which are deemed defective in workmanship or materials by the Architect.

3.9 PROTECTION, CARE, AND CLEANING

- A. Provide adequate means for, and fully protect, all finished parts of the materials and equipment against physical damage from whatever cause during the progress of this work and until final completion.
- B. During construction, properly cap all lines and equipment nozzles so as to prevent the entrance of sand, dirt, etc. Protect equipment against moisture, plaster, cement, paint or other work of other trades by covering it with polyethylene sheets.

- C. After installation has been completed, clean all systems.
- D. Piping, Ductwork and Equipment to be insulated: Clean exterior thoroughly to remove rust, plaster, cement, and dirt before insulation is applied.
- E. Piping, Ductwork and Equipment to be painted: Clean exterior of piping, ductwork and equipment, exposed in completed structure, removing rust, plaster cement, and dirt by wire brushing. Remove grease, oil, and similar materials by wiping with clean rags and suitable solvents. Touch up primer coat as required.
- F. Motors, Pumps and Other Items with Factory Finish: Remove grease and oil and leave surfaces clean and polished.
- G. Plumbing Fixtures: Clean and polish fixtures immediately prior to final inspection or Owner's occupancy. Clean floor drain grates; check each fixture to insure against trap stoppage.

3.10 LUBRICATION

- A. Upon completion of the work and before turning over to the Owner, clean and lubricate all bearings except sealed and permanently lubricated bearings. Use only lubricant recommended by the manufacturer.

3.11 PAINTING

- A. Properly prepare work under this Division to be finish painted under SECTION 09 91 00, "PAINTING".
- B. Paint duct black behind grilles and diffusers where duct is visible.

3.12 COMPLETION

- A. Before Final Review: The work hereunder will not be reviewed for final acceptance until Operating and Maintenance Data, Manufacturer's Literature, Valve Directories, Piping Identification Code Directory and name plates specified herein have been approved and properly posted in the building and final cleaning has been completed.
- B. Demonstration of Operations: When the installation is complete and adjustments specified herein have been made, operate the systems for a period of one week, during which time demonstrate to the Architect that systems are completed and operating in conformance with these specifications.

END OF SECTION

SECTION 23 05 53 - IDENTIFICATION FOR HVAC

1.0 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Equipment labels.
 - 2. Pipe labels.

1.2 SUBMITTAL

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

2.0 PRODUCTS

2.1 EQUIPMENT LABELS

- A. 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: White.
 - 3. Background Color: Black.
 - 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 2-1/2 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. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number,
- C. 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.

2.2 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 high.

3.0 EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surface of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulates.

3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

- A. Piping Color-Coding: Painting of piping is specified in Division 09 Section "Interior Painting."
- 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. Refrigerant Piping:
 - a. Background Color: Blue
 - b. Letter Color: Pink (Mauve).

END OF SECTION

SECTION 23 05 93 – TESTING, ADJUSTING & BALANCING HVAC

1.0 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Balancing Air Systems:
 - a. Constant-volume air systems.

1.2 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. ASHRAE: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
- C. NEBB: National Environmental Balancing Bureau.
- D. TAB: Testing, adjusting, and balancing.
- E. TABB: Testing, Adjusting, and Balancing Bureau.
- F. TAB Specialist: An entity engaged to perform TAB Work.

1.3 SUBMITTALS

- A. Submittal:
 - 1. Air-Balance Report: Documentation of work performed for ASHRAE 111-2008, "Balancing."
- B. Strategies and Procedures Plan: Within 90 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.
- C. Certified TAB reports.

1.4 QUALITY ASSURANCE

- A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC, NEBB or TABB.
 - 1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC, NEBB or TABB.
 - 2. TAB Technician: Employee of the TAB contractor and who is certified by AABC, NEBB, or TABB as a TAB technician.

- B. Certify TAB field data reports and perform the following:
 - 1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
 - 2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.
- C. TAB Report Forms: Use standard TAB contractor's forms approved by Architect.
- D. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

2.0 PRODUCTS (Not Applicable)

3.0 EXECUTION

3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
- B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine equipment performance data including fan and pump curves.
 - 1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
 - 2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- G. Examine test reports specified in individual system and equipment Sections.

- H. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
- I. Examine motorized dampers and variable speed drives and verify that they are accessible, and their controls are connected and functioning.
- J. Examine operating safety interlocks and controls on HVAC equipment.
- K. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

- A. Prepare a TAB plan that includes strategies and step-by-step procedures.
- B. Complete system-readiness checks and prepare reports. Verify the following:
 - 1. Permanent electrical-power wiring is complete.
 - 2. Automatic temperature-control systems are operational.
 - 3. Equipment and duct access doors are securely closed.
 - 4. Balance, smoke, and fire dampers are open.
 - 5. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
 - 6. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in ASHRAE 111-2008, or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems", or SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.
 - 1. Comply with requirements in ASHRAE 62.1-2010, Section 7.2.2, "Air Balancing."
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
 - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.

2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Division 23 Section "HVAC Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- D. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- F. Verify that motor starters are equipped with properly sized thermal protection.
- G. Check dampers for proper position to achieve desired airflow path.
- H. Check for airflow blockages.
- I. Check condensate drains for proper connections and functioning.
- J. Check for proper sealing of air-handling-unit components.
- K. Verify that air duct system is sealed as specified in Division 23 Section "Metal Ducts."

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
 1. Measure total airflow.
 - a. Where adequate space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.
 2. Measure fan static pressures as follows to determine actual static pressure:

- a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
 - b. Measure static pressure directly at the fan outlet or through the flexible connection.
 - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
 - d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
3. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
 4. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in Division 23 Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
 5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Measure air outlets and inlets without making adjustments.
1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.
- C. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.
1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
 2. Adjust patterns of adjustable outlets for proper distribution without drafts.
- D. Motorized dampers shall initially be fully open when in the unoccupied and occupied modes. Dampers shall close upon command from controls when the space(s) or are unoccupied during scheduled occupied hours. DOAS variable speed drive shall maintain constant static pressure within the ductwork. Air balancer shall witness proper operation of damper sequencing and provide statement of operation in commissioning report. Balance air distribution devices with all motorized dampers fully open.

3.6 PROCEDURES FOR MOTORS

- A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
 - 1. Manufacturer's name, model number, and serial number.
 - 2. Motor horsepower rating.
 - 3. Motor rpm.
 - 4. Efficiency rating.
 - 5. Nameplate and measured voltage, each phase.
 - 6. Nameplate and measured amperage, each phase.
 - 7. Starter thermal-protection-element rating.

3.7 PROCEDURES FOR CONDENSING/HEAT PUMPS/VARIABLE REFRIGERATN UNITS

- A. Verify proper rotation of fans.
- B. Measure entering- and leaving-air temperatures.
- C. Record compressor data.

3.8 TOLERANCES

- A. Set HVAC system's air flow rates within the following tolerances:
 - 1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
 - 2. Air Outlets and Inlets: Plus or minus 10 percent.

3.9 REPORTING

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.
- B. Status Reports: Prepare at 75% completion of construction progress report to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.10 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
 - 1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
 - 2. Include a list of instruments used for procedures, along with proof of calibration.
- B. Final Report Contents: In addition to certified field-report data, include the following:
 - 1. Fan curves.
 - 2. Manufacturers' test data.
 - 3. Field test reports prepared by system and equipment installers.
 - 4. Other information relative to equipment performance; do not include Shop Drawings and product data.
- C. General Report Data: In addition to form titles and entries, include the following data:
 - 1. Title page.
 - 2. Name and address of the TAB contractor.
 - 3. Project name.
 - 4. Project location.
 - 5. Architect's name and address.
 - 6. Engineer's name and address.
 - 7. Contractor's name and address.
 - 8. Report date.
 - 9. Signature of TAB supervisor who certifies the report.
 - 10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
 - 11. Summary of contents including the following:
 - a. Indicated versus final performance.
 - b. Notable characteristics of systems.

- c. Description of system operation sequence if it varies from the Contract Documents.
 12. Nomenclature sheets for each item of equipment.
 13. Data for terminal units, including manufacturer's name, type, size, and fittings.
 14. Notes to explain why certain final data in the body of reports vary from indicated values.
 15. Test conditions for fans and pump performance forms including the following:
 - a. Settings for outdoor-, return-, and exhaust-air dampers.
 - b. Conditions of filters.
 - c. Cooling coil, wet- and dry-bulb conditions.
 - d. Fan drive settings including settings and percentage of maximum pitch diameter.
 - e. Settings for supply-air, static-pressure controller.
 - f. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
 2. Duct, outlet, and inlet sizes.
 3. Terminal units.
 4. Balancing stations.
 5. Position of balancing devices.
- E. Air-Handling (Fan coils) Test Reports: For air-handling units with coils, include the following (as applicable):
1. Unit Data:
 - a. Unit identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and unit size.
 - e. Manufacturer's serial number.
 - f. Unit arrangement and class.
 - g. Discharge arrangement.
 - h. Sheave make, size in inches, and bore.
 - i. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 - j. Number, make, and size of belts.
 - k. Number, type, and size of filters.

2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave, and amount of adjustments in inches.

3. Test Data (Indicated and Actual Values):
 - a. Total air flow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Filter static-pressure differential in inches wg.
 - f. Preheat-coil static-pressure differential in inches wg.
 - g. Cooling-coil static-pressure differential in inches wg.
 - h. Heating-coil static-pressure differential in inches wg.
 - i. Outdoor airflow in cfm.
 - j. Return airflow in cfm.
 - k. Outdoor-air damper position.
 - l. Return-air damper position.

F. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:
 - a. System identification.
 - b. Location.
 - c. Make and type.
 - d. Model number and size.
 - e. Manufacturer's serial number.
 - f. Arrangement and class.
 - g. Sheave make, size in inches, and bore.
 - h. Center-to-center dimensions of sheave, and amount of adjustments in inches.
2. Motor Data:
 - a. Motor make, and frame type and size.
 - b. Horsepower and rpm.
 - c. Volts, phase, and hertz.
 - d. Full-load amperage and service factor.
 - e. Sheave make, size in inches, and bore.
 - f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
 - g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):
 - a. Total airflow rate in cfm.
 - b. Total system static pressure in inches wg.
 - c. Fan rpm.
 - d. Discharge static pressure in inches wg.
 - e. Suction static pressure in inches wg.

G. Air-Terminal-Device Reports:

1. Unit Data:
 - a. System and air-handling unit identification.
 - b. Location and zone.
 - c. Apparatus used for test.
 - d. Area served.
 - e. Make.
 - f. Number from system diagram.
 - g. Type and model number.
 - h. Size.
 - i. Effective area in sq. ft.
2. Test Data (Indicated and Actual Values):
 - a. Air flow rate in cfm.
 - b. Air velocity in fpm.
 - c. Preliminary air flow rate as needed in cfm.
 - d. Preliminary velocity as needed in fpm.
 - e. Final air flow rate in cfm.
 - f. Final velocity in fpm.
 - g. Space temperature in deg F.

3.11 INSPECTIONS

A. Initial Inspection:

1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
2. Check the following for each system:
 - a. Measure airflow of at least 10 percent of air outlets.
 - b. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
 - c. Verify that balancing devices are marked with final balance position.
 - d. Note deviations from the Contract Documents in the final report.

B. Final Inspection:

1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Commissioning Authority.
 2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of the Commissioning Authority.
 3. Commissioning Authority shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
 4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
 5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
- C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:
1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
 2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.
- D. Prepare test and inspection reports.

END OF SECTION

SECTION 23 07 13 – DUCT INSULATION

1.0 GENERAL

1.1 SUMMARY

- A. Section includes insulating the following duct services:
 - 1. Indoor, concealed supply and outdoor air.
 - 2. Indoor, exposed supply and outdoor air.
 - 3. Indoor, concealed return located in unconditioned space.
 - 4. Indoor, exposed return located in unconditioned space.
- B. Related Sections:
 - 1. Division 23 Section "HVAC Piping Insulation."

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Submittals:
 - 1. Laboratory Test Reports for Credit EQ 4: For adhesives and sealants, documentation indicating that product 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.

1.3 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.

2.0 PRODUCTS

2.1 INSULATION MATERIALS

- A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum 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. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article. Thickness – 2".
 - 1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. CertainTeed Corp.; SoftTouch Duct Wrap.
 - b. Johns Manville; Microlite.
 - c. Knauf Insulation; Friendly Feel Duct Wrap.
 - d. Manson Insulation Inc.; Alley Wrap.
 - e. Owens Corning; SOFTR All-Service Duct Wrap.

2.2 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. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
 - 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-127.
 - b. Eagle Bridges - Marathon Industries; 225.
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.

- d. Mon-Eco Industries, Inc.; 22-25.
 2. 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. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
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-82.
 - b. Eagle Bridges - Marathon Industries; 225.
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-50.
 - d. Mon-Eco Industries, Inc.; 22-25.
 2. 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.

2.3 TAPES

- A. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. ABI, Ideal Tape Division; 491 AWF FSK.
 - b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
 - c. Compac Corporation; 110 and 111.
 - d. Venture Tape; 1525 CW NT, 1528 CW, and 1528 CW/SQ.
 2. Width: 3 inches.
 3. Thickness: 6.5 mils.
 4. Adhesion: 90 ounces force/inch in width.

5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

2.4 SECUREMENTS

- A. Aluminum Bands: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020-inch-thick, 1/2 inch wide with wing seal or closed seal.
 1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. ITW Insulation Systems; Gerrard Strapping and Seals.
 - b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs.
- B. Insulation Pins and Hangers:
 1. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
 - a. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - 1) AGM Industries, Inc.; Tactoo Perforated Base Insul-Hangers.
 - 2) GEMCO; Perforated Base.
 - 3) Midwest Fasteners, Inc.; Spindle.
 - b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030-inch-thick by 2 inches square.
 - c. Spindle: Aluminum, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
 - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
 2. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely

in position indicated when self-locking washer is in place. Comply with the following requirements:

- a. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - 1) AGM Industries, Inc.; Tactoo Self-Adhering Insul-Hangers.
 - 2) GEMCO; Peel & Press.
 - 3) Midwest Fasteners, Inc.; Self Stick.
 - b. Baseplate: Galvanized carbon-steel sheet, 0.030-inch-thick by 2 inches square.
 - c. Spindle: Aluminum, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
 - d. Adhesive-backed base with a peel-off protective cover.
3. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick, galvanized-steel or aluminum sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
- a. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - 1) AGM Industries, Inc.; RC-150.
 - 2) GEMCO; R-150.
 - 3) Midwest Fasteners, Inc.; WA-150.
 - 4) Nelson Stud Welding; Speed Clips.
4. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.

2.5 CORNER ANGLES

- A. Aluminum Corner Angles: 0.040-inch-thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14.

3.0 EXECUTION

3.1 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.
- B. Install insulation materials, vapor barriers or retarders, and thicknesses required for each item of duct 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 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. Keep insulation materials dry during application and finishing.
- G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- H. Install insulation with least number of joints practical.
- I. 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.
- J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- K. 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. 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 duct flanges and fittings.
- L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- N. 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.

3.3 PENETRATIONS

- A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- B. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
1. Comply with requirements in Division 07 Section "Penetration Firestopping" for firestopping and fire-resistive joint sealers.
- C. Insulation Installation at Floor Penetrations:
1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

3.4 INSTALLATION OF MINERAL-FIBER INSULATION

- A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 50 percent coverage of duct and plenum surfaces.
 2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
 3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
 - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
 - b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
 - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
 - d. Do not over compress insulation during installation.
 - e. Impale insulation over pins and attach speed washers.
 - f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
 4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1-inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
 - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
 - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and

surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.

5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.5 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.

3.6 FIRE-RATED INSULATION SYSTEM INSTALLATION

- A. Where fire-rated insulation system is indicated, secure system to ducts and duct hangers and supports to maintain a continuous fire rating.
- B. Insulate duct access panels and doors to achieve same fire rating as duct.
- C. Install firestopping at penetrations through fire-rated assemblies. Fire-stop systems are specified in Division 07 Section "Penetration Firestopping."

3.7 DUCT INSULATION SCHEDULE, GENERAL

- A. Ducts Requiring Insulation:
 1. Indoor, concealed supply and outdoor air.
 2. Indoor, exposed supply and outdoor air.

3. Indoor, concealed return located in unconditioned space.
4. Indoor, exposed return located in unconditioned space.

B. Items Not Insulated:

1. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
2. Factory-insulated flexible ducts.
3. Factory-insulated plenums and casings.
4. Flexible connectors.
5. Vibration-control devices.
6. Factory-insulated access panels and doors.

END OF SECTION

SECTION 23 07 19 – HVAC PIPING INSULATION

1.0 GENERAL

1.1 SUMMARY

- A. Section includes insulating the following HVAC piping systems:
 - 1. Refrigerant liquid, suction and hot-gas piping, indoors and outdoors.
- B. Related Sections:
 - 1. Section 23 07 13 "Duct Insulation."
- C. Definitions:
 - 1. Air-conditioned space: Space directly supplied with heated or cooled air.
 - 2. ASJ+: All service jacket, white finish facing or jacket.
 - 3. Cold: Piping handling media at design temperature of 60°F or below.
 - 4. Concealed: Piping above ceilings and in chases, interstitial space, and pipe spaces.
 - 5. Conditioned Space: A room area which is heated or cooled.
 - 6. Exposed: Piping exposed to view in finished areas including mechanical and electrical equipment rooms. Attics and crawl spaces where air handling units are located are considered to be mechanical rooms. Shafts, chases, interstitial spaces, unfinished attics, crawl spaces and pipe basements are not considered finished areas.
 - 7. FSK: Foil-scrim-kraft facing.
 - 8. Thermal conductance: Heat flow rate through materials.
 - a. Flat surface: BTU per hour per square foot.
 - b. Pipe or cylinder: BTU per hour per linear foot.
 - 9. Thermal conductivity ('k'): BTU per inch thickness, per hour, per square foot, per degree Fahrenheit temperature difference.
 - 10. Unconditioned Space: A room or area which is neither directly heated nor cooled.

1.2 SUBMITTALS

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

B. Submittals:

1. For adhesives and sealants, documentation including printed statement of VOC content and chemical components.
2. For adhesives and sealants, documentation indicating that product 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.

1.3 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 and inspecting 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.

2.0 PRODUCTS

2.1 INSULATION MATERIALS

- A. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- B. 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.
- C. Glass Fiber: ASTM C547; rigid molded noncombustible.
1. 'K' ('ksi') Value: 0.24 at 75°F mean temperature.
 2. Maximum Service Temperature; 1200°F.
 3. Vapor Barrier Jacket: White Draft paper reinforced with glass fiber yarn and bonded to aluminized film, secure with self-sealing longitudinal laps and butt strips or with outward clinch expanding staples and vapor barrier.
 4. Products: Subject to compliance with requirements, provide one of the following:
 - a. Owens-Corning.
 - b. Fiberglas.

- c. CertainTeed
 - d. Knauf.
- D. 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.
- E. Inserts:
- 1. Insulation inserts at pipe supports: Provide for all insulated piping. Install with metal insulation shields furnished with pipe supports, Section 15010 General Mechanical Provisions.
 - 2. Material: Premolded, high density mineral fiber blocks, minimum density 20 lb/ft³, of same thickness as adjacent insulation.
 - 3. Up through 5-inch pipe use 6-inch-long insert blocks, 12" long for larger pipes.
 - 4. Optional insert material: 180-degree segment of calcium silicate.

2.2 ADHESIVES

- A. 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 Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.
 - 2. 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.
- B. PVC Jacket Adhesive: Compatible with PVC jacket.

1. Products: Subject to compliance with requirements, provide one of 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. 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.

2.3 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, provide one of the following:
 - a. Foster Brand, Specialty Construction Brands, Inc., a business 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.

2.4 SEALANTS

- A. Joint Sealants:

1. Joint Sealants for Cellular-Glass 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-76.
 - b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-45.
 - c. Pittsburgh Corning Corporation; Pittseal 444.
 2. Materials shall be compatible with insulation materials, jackets, and substrates.
 3. Permanently flexible, elastomeric sealant.
 4. Service Temperature Range: Minus 100 to plus 300 deg F.
 5. Color: White or gray.
 6. Use sealants that comply 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.
- B. Metal Jacket Flashing Sealants:
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-76.
 - b. Eagle Bridges - Marathon Industries; 405.
 - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
 2. Materials shall be compatible with insulation materials, jackets, and substrates.
 3. Fire- and water-resistant, flexible, elastomeric sealant.
 4. Service Temperature Range: Minus 40 to plus 250°F.
 5. Color: Aluminum.
 6. Use sealants that comply 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 Flashing Sealants:

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-76.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250°F.
5. Color: White.
6. Use sealants that comply 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.

2.5 FIELD-APPLIED JACKETS

- A. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, 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, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
- B. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, 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. Finish and thickness are indicated in field-applied jacket schedules.
 3. Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper or 2.5-mil- thick polysurlyn.
 4. 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. End caps.
 - e. Beveled collars.
 - f. Valve covers.
 - g. Field fabricate fitting covers only if factory-fabricated fitting covers are not available.
- C. Self-Adhesive Outdoor Jacket: 60-mil- thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a cross-laminated polyethylene film covered with white aluminum-foil facing.
1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:

- a. Polyguard Products, Inc.; Alumaguard 60.

2.6 SECUREMENTS

- A. Aluminum Bands: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal or closed seal.
 1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. ITW Insulation Systems; Gerrard Strapping and Seals.
 - b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs.

3.0 EXECUTION

3.1 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.2 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. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, and seal patches similar to butt joints.

3.3 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 Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
 - 1. Seal penetrations with flashing sealant.
 - 2. 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.
- C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
 - 1. Comply with requirements in Division 07 Section "Penetration Firestopping" for firestopping and fire-resistive joint sealers.
- E. Insulation Installation at Floor Penetrations:
 - 1. Pipe: Install insulation continuously through floor penetrations.
 - 2. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

3.4 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, and Valves:
 - 1. Install insulation over fittings, valves, 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. 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.
 6. For services not specified to receive a field-applied jacket except for flexible elastomeric, install fitted PVC cover over elbows, tees and valves. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
- 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.

3.5 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. Seal longitudinal seams and end joints with manufacturers recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. 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.
- C. 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. 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.

3.6 FIELD-APPLIED JACKET INSTALLATION

A. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints; for horizontal applications. Seal with manufacturers 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.

3.7 PIPING INSULATION SCHEDULE

Fluid Temp Range (°F)	Conductivity Range (in Btu-inch per hour per square foot per °F)	Insulation mean rating temperature (°F)	Nominal Pipe diameter (in inches)						
			<1	1 to <1.5	1.5 to <4	4 to < 8	8 & Larger		
			Minimum required insulation thickness, inches						
Space heating, Hot Water systems (steam, steam condensate, and hot water) and Service Water Heating Systems (recirculating sections, all piping and electric trace tape systems, and the first 8 feet of piping from the storage tank for non-recirculating systems)									
201-250	0.27-0.30	150	2.5	2.5	2.5	3.0	3.0		
141-200	0.25-0.29	125	1.5	1.5	2.0	2.0	2.0		
105-140	0.22-0.28	100	1.0	1.5	1.5	1.5	1.5		
Space cooling systems (Refrigerant, Chilled Water) and Condensate Drain Line									
40-60	0.21-0.27	75	NonRes 0.5	Res 0.75	NonRes 0.5	Res 0.75	1.0	1.0	1.0
Below 40	0.20-0.26	50	1.0		1.5		1.5	1.5	1.5

Split Heat Pump and VRF/VRV Refrigerant Piping Systems											
Refrigerant Condition or Phase	Refrigerant Temperature Range (°F)	Insulation mean rating temperature (°F)	ACR TUBING OUTSIDE DIAMETER								
			1/4"	3/8"	1/2"	5/8"	3/4"	7/8"	1-1/8"	1-3/8"	1-5/8"
			INSULATION THICKNESS REQUIRED (INCHES)								
HI PRESS VAPOR	201-250	150			2-1/2"	2-1/2"	2-1/2"	2-1/2"	2-1/2"	2-1/2"	2-1/2"
	141-200	125			1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	2"
LIQUID	105-140	100	1"	1"	1"	1"	1"	1"	1-1/2"		
LOW PRESSURE VAPOR	40-60	75			1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1"
	BELOW 40	50			1"	1"	1"	1"	1-1/2"	1-1/2"	1-1/2"

3.8 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material.

- B. If more than one material is listed, selection from materials listed is Contractor's option.
- C. Piping, Exposed:
 - 1. PVC: 20 mils thick.

END OF SECTION

SECTION 23 09 00 – INSTRUMENTATION & CONTROLS

1.0 GENERAL

1.1 SUMMARY

- A. This Section includes control equipment and wiring for HVAC systems and components, including control components for units not supplied with factory-wired controls. Systems included:
 - 1. Split variable refrigerant volume (VRV)
 - 2. Furnace
 - 3. General exhaust
 - 4. Kitchen hood make-up air and exhaust
- B. Refer to drawings for "Sequence of Operations for HVAC Controls" that relate to this Section.

1.2 RELATED SECTIONS

- A. 23 05 00 – Common Work Results for HVAC
- B. 23 34 23 – Power Ventilators
- C. 23 81 26 – VRV Heat Pump
- D. 23 81 27 – VRV Heat Recovery
- E. 23 81 28 – VRV Fan Coils

1.3 SUBMITTALS

- A. Product Data: For each control device indicated.
- B. Operation and maintenance data.

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.

2.0 PRODUCTS

2.1 CONTROL SYSTEM

- A. Control system shall consist of sensors, indicators, actuators, final control elements, interface equipment, other apparatus, and accessories to control mechanical systems.

2.2 THERMOSTATS (FURNACE SYSTEMS ONLY)

A. Manufacturers:

- 1. As listed by the California Energy Commission for Title 24 compliance as a Occupancy Controlled Smart Thermostat.
- 2. As furnished by VRV system manufacturer.

B. Electric, solid-state, microcomputer-based room thermostat.

- 1. Automatic switching from heating to cooling.
- 2. Preferential rate control to minimize overshoot and deviation from set point.
- 3. Set up for four separate temperatures per day.
- 4. Instant override of set point for continuous or timed period from 1 hour to 31 days.
- 5. Short-cycle protection.
- 6. Programming based on every day of week.
- 7. Selection features include degree F or degree C display, 12- or 24-hour clock, keyboard disable, remote sensor, and fan on-auto.
- 8. Battery replacement without program loss.
- 9. Thermostat display features include the following:
 - a. Time of day.
 - b. Actual room temperature.
 - c. Programmed temperature.
 - d. Programmed time.
 - e. Duration of timed override.
 - f. Day of week.
 - g. System mode indications include "heating," "off," "fan auto," and "fan on."

C. Room thermostat accessories include the following:

1. Thermostat Guards: Metal wire, tamperproof.
2. Adjusting Key: As required for calibration and cover screws.

3.0 EXECUTION

3.1 INSTALLATION

- A. Verify location of thermostats and other exposed control sensors with Drawings and room details before installation. Install devices 42 inches above the floor.
- B. Install guards on thermostats in the following locations:
 1. Activity 109
 2. Dining 112.
 3. Living 122.
 4. Where indicated.
- C. Install labels and nameplates to identify control components according to Division 23 Section "Identification for HVAC Piping and Equipment."

3.2 ELECTRICAL WIRING AND CONNECTION INSTALLATION

- A. Install raceways, boxes, and cabinets according to Division 26 Section "Raceway and Boxes for Electrical Systems."
- B. Install building wire and cable according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."
- C. Install signal and communication cable according to Division 27 Section "Communications Horizontal Cabling."
 1. Conceal cable, except in mechanical rooms and areas where other conduit and piping are exposed.
 2. Install exposed cable in raceway.
 3. Install concealed cable in raceway.
 4. Bundle and harness multiconductor instrument cable in place of single cables where several cables follow a common path.
 5. Fasten flexible conductors, bridging cabinets and doors, along hinge side; protect against abrasion. Tie and support conductors.
 6. Number-code or color-code conductors for future identification and service of control system, except local individual room control cables.

7. Install wire and cable with sufficient slack and flexible connections to allow for vibration of piping and equipment.
- D. Connect manual-reset limit controls independent of manual-control switch positions. Automatic duct heater resets may be connected in interlock circuit of power controllers.
- E. Connect hand-off-auto selector switches to override automatic interlock controls when switch is in hand position.

3.3 FIELD QUALITY CONTROL

A. VRV Systems

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove and replace malfunctioning units and retest.
2. Test and adjust controls and safeties.
3. Test calibration of controllers by disconnecting input sensors and stimulating operation with compatible signal generator.
4. Test each point through its full operating range to verify that safety and operating control set points are as required.
5. Test each control loop to verify stable mode of operation and compliance with sequence of operation. Adjust PID actions.
6. Test each system for compliance with sequence of operation.
7. Test software and hardware interlocks.

C. Replace damaged or malfunctioning controls and equipment and repeat testing procedures.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain HVAC instrumentation and controls. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION

SECTION 23 23 00 – REFRIGERANT PIPING

1.0 GENERAL

1.1 SUMMARY

- A. This Section includes refrigerant piping used for air-conditioning applications.

1.2 PERFORMANCE REQUIREMENTS

- A. Line Test Pressure for Refrigerant R-410A:
 - 1. Suction Lines for Heat-Pump and/or Variable Refrigerant Applications: 535 psig.
 - 2. Hot-Gas and Liquid Lines: 535 psig.
 - 3. Refer to manufacturer's installation for further guidance and adherence.

1.3 REFERENCE STANDARDS

- A. ANSI B16.22 Wrought Copper and Wrought Copper Alloy Solder Joint Pressure Fittings
- B. ASTM B88 Seamless Copper Water Tube
- C. ASTM B280 Seamless copper Tube for Air Conditioning and Refrigeration Field Service
- D. ASTM 210 Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes
- E. ASHRAE 15 Safety Code for Refrigeration Systems
- F. ASME B31.5 Refrigeration Piping and Heat Transfer Components
- G. UL207 Refrigerant-Containing Components and Accessories, Nonelectrical

1.4 QUALITY ASSURANCE

- A. Order all copper refrigeration tube with each shipping unit marked with the metal or alloy designation, temper, size, and name of supplier; with soft straight lengths or coils identified with a tag indicating that the product was manufactured in accordance with ASTM B280; and with each hard temper straight length identified throughout its length by a blue colored marking not less than 3/16 inch in height and a legend at intervals of not greater than three feet that includes the designation "ACR" and pipe outside diameter.
- B. Order all aluminum refrigeration tube with each shipping unit marked with metal or alloy designation, temper, size, and name of supplier; with soft straight lengths

identified with a tag indicating that the product was manufactured in accordance with ASTM B210 and complies with ASME B31.5; and with each hard temper straight length identified throughout is length by a marking not less than 3/16 inch in height and a legend at intervals of not greater than three feet that includes the designation "ACR" and pipe outside diameter. Each hard temper straight length shall be manufactured in accordance to ASTM B210 and comply with ASME B31.5

- C. Any installed material not meeting the specification requirements must be replaced with material that meets these specifications without additional cost to the Owner.

1.5 PRODUCT STORAGE AND HANDLING

- A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

1.6 COORDINATION

- A. Coordinate size and location of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

2.0 PRODUCTS

2.1 COPPER TUBE AND FITTINGS

- A. Copper Tube: ASTM B 280, Type ACR.
- B. Wrought-Copper Fittings: ASME B16.22.
- C. Wrought-Copper Unions: ASME B16.22.
- D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.
- E. Brazing Filler Metals: AWS A5.8.
- F. Flexible Connectors:
 - 1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
 - 2. End Connections: Socket ends.
 - 3. Offset Performance: Capable of minimum 3/4-inch misalignment in minimum 7-inch- long assembly.
 - 4. Pressure Rating: Factory test at minimum 500 psig.
 - 5. Maximum Operating Temperature: 250 deg F.

- G. As an option, with manufacturer's and local building department acceptance, use ASTM B210 seamless drawn aluminum tubing, cleaned and capped in accordance with ASTM B280, and comply with ASME B31.5, with REFLOK steel fittings. If Aluminum tubing is substituted, the joints must be made without the use of heat. Any joint fitting must be UL or ETL listed and tested per UL-207 for joining refrigeration tubing using either copper or aluminum tubing. ETL tested and listed to UL 207 REFLOK fittings for joining copper to copper, aluminum to aluminum or aluminum to copper. Fittings shall be certified to a working pressure of 600 psi.

2.2 REFRIGERANTS

- 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. Atofina Chemicals, Inc.
 - 2. DuPont Company; Fluorochemicals Div.
 - 3. Honeywell, Inc.; Genetron Refrigerants.
 - 4. INEOS Fluor Americas LLC.
- C. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.

3.0 EXECUTION

3.1 PIPING APPLICATIONS FOR REFRIGERANT R-410A

- A. Hot-Gas, Liquid and Suction Lines:
 - 1. Copper, Type ACR, annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints per manufacturers' installation directions.

3.2 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, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
- B. Install refrigerant piping according to ASHRAE 15.
- C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping adjacent to machines to allow service and maintenance.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Select system components with pressure rating equal to or greater than system operating pressure.
- J. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- K. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Division 08 Section "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.
- L. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.
- M. Slope refrigerant piping as follows:
 - 1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
 - 2. Install horizontal suction lines with a uniform slope downward to compressor.
 - 3. Install traps and double risers to entrain oil in vertical runs.
 - 4. Liquid lines may be installed level.
- N. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.
- O. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
- P. Identify refrigerant piping and valves according to Division 23 Section "Identification for HVAC."

- Q. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 23 Section "Sleeves and Sleeve Seals for HVAC Piping."
- R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 23 Section "Escutcheons for HVAC Piping."

3.3 PIPE 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 pipe and fittings before assembly.
- C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.
- D. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
 - 1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
 - 2. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.

3.4 HANGERS AND SUPPORTS

- A. Hanger, support, and anchor products are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."
- B. Install the following pipe attachments:
 - 1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet long.
 - 2. Roller hangers and spring hangers for individual horizontal runs 20 feet or longer.
 - 3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
 - 4. Spring hangers to support vertical runs.
 - 5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

- C. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:
1. Verify actual supported loads for hanger sizes and spacing. Consult structural engineer. Spacing and sizes in subparagraphs below are from the 2000 ASHRAE HANDBOOK - "HVAC Systems and Equipment."
 2. NPS 1/2: Maximum span, 60; minimum rod size, 1/4 inch.
 3. NPS 5/8: Maximum span, 60 inches; minimum rod size, 1/4 inch.
 4. NPS 1: Maximum span, 72 inches; minimum rod size, 1/4 inch.
 5. NPS 1-1/4: Maximum span, 96 inches; minimum rod size, 3/8 inch.
 6. NPS 1-1/2: Maximum span, 96 inches; minimum rod size, 3/8 inch.
 7. NPS 2: Maximum span, 96 inches; minimum rod size, 3/8 inch.
 8. NPS 2-1/2: Maximum span, 108 inches; minimum rod size, 3/8 inch.
 9. NPS 3: Maximum span, 10 feet; minimum rod size, 3/8 inch.
 10. NPS 4: Maximum span, 12 feet; minimum rod size, 1/2 inch.
- D. Install hangers for steel piping with the following maximum spacing and minimum rod sizes:
1. NPS 2: Maximum span, 10 feet; minimum rod size, 3/8 inch.
 2. NPS 2-1/2: Maximum span, 11 feet; minimum rod size, 3/8 inch.
 3. NPS 3 Maximum span, 12 feet; minimum rod size, 3/8 inch.
 4. NPS 4: Maximum span, 14 feet; minimum rod size, 1/2 inch.
- E. Support multi-floor vertical runs at least at each floor.

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
1. Comply with ASME B31.5, Chapter VI.
 2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.

3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.
 - a. Fill system with nitrogen to the required test pressure.
 - b. System shall maintain test pressure at the manifold gage throughout duration of test.
 - c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
 - d. Remake leaking joints using new materials and retest until satisfactory results are achieved.

3.6 SYSTEM CHARGING AND ADJUSTING

- A. Charge system using the following procedures:
 1. Install in accordance with manufacturer's directions.

END OF SECTION

SECTION 23 31 13 – METAL DUCTS

1.0 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rectangular ducts and fittings.
2. Round ducts and fittings.
3. Sheet metal materials.
4. Sealants and gaskets.
5. Hangers and supports.
6. Seismic-restraint devices.

B. Related Sections:

1. Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Division 23 Section "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA-2006 "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article. All supply return and exhaust ductwork shall be constructed to 2" pressure classification.
- B. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and ASCE/SEI 7-10, SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical - OSHPD."
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Submittals:
 - 1. Product Data for Prerequisite EQ 1: Documentation indicating that duct system complies with ASHRAE 62.1, Section 5 - "Systems and Equipment."
 - 2. Documentation indicating that duct system complies with ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."
 - 3. Documentation of work performed for compliance with ASHRAE 62.1, Section 7.2.4 - "Ventilation System Start-Up."
 - 4. For adhesives and sealants, documentation indicating that products comply 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."
- C. Delegated-Design Submittal:
 - 1. Sheet metal thicknesses.
 - 2. Joint and seam construction and sealing.
 - 3. Reinforcement details and spacing.
 - 4. Materials, fabrication, assembly, and spacing of hangers and supports.

1.4 QUALITY ASSURANCE

- A. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."
- B. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

2.0 PRODUCTS

2.1 RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA-2006 "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements,

materials involved, duct-support intervals, and other provisions in SMACNA-2006 "HVAC Duct Construction Standards - Metal and Flexible."

- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA-2006 "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
 - 1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. McGill AirFlow LLC.
 - b. SEMCO Incorporated.
 - c. Sheet Metal Connectors, Inc.
 - d. Spiral Manufacturing Co., Inc.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," using 45° lateral taps and Figure 3-6, "Conical Tees," for static-pressure

class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA-2006 "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G60.
 - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Stainless Steel: ASTM A480.
- D. Aluminum Sheets: ASTM B209, alloy 3003, temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.
- E. Extruded Aluminum: ASTM B221, alloy 6063, temper T6.
- F. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
 - 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.
- G. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.4 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:
 - 1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
 - 2. Tape Width: 3 inches.

3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. Sealant shall comply 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."

C. Water-Based Joint and Seam Sealant:

1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

2.5 HANGERS AND SUPPORTS

- A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
- B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

- C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
- D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
- E. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- F. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- G. Trapeze and Riser Supports:
 - 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

2.6 SEISMIC-RESTRAINT DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2. Ductmate Industries, Inc.
 - 3. Hilti Corp.
 - 4. Kinetics Noise Control.
 - 5. Mason Industries.
 - 6. TOLCO; a brand of NIBCO INC.
 - 7. Unistrut Corporation; Tyco International, Ltd.
- B. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an evaluation service member of the ICC Evaluation Service or the Office of Statewide Health Planning and Development for the State of California or an agency acceptable to authorities having jurisdiction.
 - 1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.
- C. Channel Support System: Shop- or field-fabricated support assembly made of slotted steel channels rated in tension, compression, and torsion forces and with accessories for attachment to braced component at one end and to building structure at the other end. Include matching components and corrosion-resistant coating.

- D. Restraint Cables: ASTM A 603, galvanized-steel cables with end connections made of cadmium-plated steel assemblies with brackets, swivel, and bolts designed for restraining cable service; and with an automatic-locking and clamping device or double-cable clips.
- E. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections or reinforcing steel angle clamped] to hanger rod.
- F. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

3.0 EXECUTION

3.1 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

- K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Air Duct Accessories" for fire and smoke dampers.
- L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

3.2 INSTALLATION OF EXPOSED DUCTWORK

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.
- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

- A. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
 - 1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
 - 2. Outdoor, Supply-Air Ducts: Seal Class A.
 - 3. Outdoor, Exhaust Ducts: Seal Class C.
 - 4. Outdoor, Return-Air Ducts: Seal Class C.
 - 5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
 - 6. Unconditioned Space, Exhaust Ducts: Seal Class C.
 - 7. Unconditioned Space, Return-Air Ducts: Seal Class B.
 - 8. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
 - 9. Conditioned Space, Exhaust Ducts: Seal Class B.

10. Conditioned Space, Return-Air Ducts: Seal Class C.

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Where practical, install concrete inserts before placing concrete.
 - 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 - 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 - 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
 - 5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 SEISMIC-RESTRAINT-DEVICE INSTALLATION

- A. Install ducts with hangers and braces designed to support the duct and to restrain against seismic forces required by applicable building codes. Comply with SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems." And ASCE/SEI 7-10.
 - 1. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.

2. Brace a change of direction longer than 12 feet.
- B. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.
- C. Install cables so they do not bend across edges of adjacent equipment or building structure.
- D. Install cable restraints on ducts that are suspended with vibration isolators.
- E. Install seismic-restraint devices using methods approved by an evaluation service member of the ICC Evaluation Service, the Office of Statewide Health Planning and Development for the State of California or an agency acceptable to authorities having jurisdiction.
- F. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, to upper truss chords of bar joists, or to concrete members.
- G. Drilling for and Setting Anchors:
 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcement or embedded items during drilling. Notify the Architect if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
 3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
 4. Set anchors to manufacturer's recommended torque, using a torque wrench.
 5. Install zinc-coated steel anchors for interior applications and stainless-steel anchors for applications exposed to weather.

3.6 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Division 23 Section "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.7 DUCT CLEANING

- A. Clean new duct system(s) before testing, adjusting, and balancing.

- B. Use service openings for entry and inspection.
1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Division 23 Section "Air Duct Accessories" for access panels and doors.
 2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
 3. Remove and reinstall ceiling to gain access during the cleaning process.
- C. Particulate Collection and Odor Control:
1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
 2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.
- D. Clean the following components by removing surface contaminants and deposits:
1. Air outlets and inlets (registers, grilles, and diffusers).
 2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
 3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
 4. Coils and related components.
 5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
 6. Supply-air ducts, dampers, actuators, and turning vanes.
 7. Dedicated exhaust and ventilation components and makeup air systems.
- E. Mechanical Cleaning Methodology:
1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.

2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.8 START UP

- A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

3.9 DUCT SCHEDULE

- A. Fabricate ducts with galvanized sheet steel
- B. Intermediate Reinforcement:
 1. Galvanized-Steel Ducts: Galvanized steel.
- C. Elbow Configuration:
 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
 - a. Velocity 1000 fpm or Lower:
 - 1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
 - 2) Mitered Type RE 4 without vanes.
 - b. Velocity 1000 to 1500 fpm:
 - 1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.

- 2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
 - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
- c. Velocity 1500 fpm or Higher:
- 1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - 2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
- a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
 - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
 - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."
- a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
 - 1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
 - 2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
 - 3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
 - b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
 - c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam.

D. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."
 - a. Rectangular Main to Rectangular Branch: 45-degree entry.
 - b. Rectangular Main to Round Branch: Spin in.
2. Round: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.
 - a. Velocity 1000 fpm or Lower: 90-degree tap.
 - b. Velocity 1000 to 1500 fpm: Conical tap.
 - c. Velocity 1500 fpm or Higher: 45-degree lateral.

E. General requirements:

1. Verify all dimensions at the site making all field measurements and shop drawings necessary for fabrication and erection of sheet metal work. Dimensions shown are net free areas. Lined ducts shall be fabricated so that new dimensions to inside of lining shall equal the sizes shown on drawings.
2. Make allowances for beams, pipes or other obstructions in building construction and for work of other trades. Check plans showing work of other trades and consult with Architect in the event of any interference.
3. Fittings: Manufactured fittings for all exposed ductwork. Use slop fit couplings for all joints.
4. Low Pressure Ductwork: Sheet metal gauges, transverse joint type and spacing, reinforcing type and spacing. In accordance with latest ASHRAE and SMACNA Schedules for low-pressure ductwork. Figures below are from the SMACNA Manual
5. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by written permission.
6. Elbows shall be standard radius or square with vanes as shown on Fig 4-2, 3 & 4. Single vanes with $\frac{3}{4}$ " trailing edge are preferred. Adjust the vanes so that the railing edges are parallel with the downstream duct when entering and leaving duct sizes are not equal. Turning vanes used in acoustically lined duct shall use an acoustical noise reduction turning vane.
7. Offsets & transitions - Fig 4-7, branch connections as illustrated in - Fig 4-1 or as indicated on the plans.

8. Round laterals - Fig 3-5, straight tees are not acceptable.
9. Conical tees and wyes— Fig 3-6.
10. Junctions between ducts: Branch take-off with 45° or 90° tapered spin-in. No branch duct to intersect main duct on bottom.
11. Seal all longitudinal and transverse duct and plenum joints and field formed seams airtight (Seal Class B) with medium water based, low VOC, pressure duct sealant.
12. Joints between ducts: Make with beaded sleeve joints. Apply duct sealer to male end. Mechanically fasten with sheet metal screws or pop rivets. Over joint and screw or rivet heads, apply coating of duct sealer.
13. Supports for ducts and plenums shall be band iron supports according to Section 4.
14. All ductwork shall be concealed behind finished wall, ceilings or floors unless specifically noted “exposed” on the drawings. Ductwork shown to be exposed shall be installed to provide maximum headroom and/or floor space.
15. Increase duct sizes gradually, not exceeding 15° divergence wherever possible. Divergence upstream of equipment shall not exceed 30°; convergence downstream shall not exceed 45°.
16. Access Panels and Doors in Ductwork: Provide in ductwork as indicated and wherever necessary or required for proper access to all instruments, controls, fire and automatic dampers and equipment and for convenient inspection and maintenance. Size as approved by Architect.
17. Install ductwork of sizes, runs and connections as shown on drawings.
18. Fabricate ductwork in workman-like manner with airtight joints; presenting smooth surfaces on inside, neatly finished on outside; construct with curves, bends; turning vanes to aid in easy flow of air. Make internal ends of slip joints in directions of air flow.
19. Install ductwork to provide maximum headroom.
20. Adjust ducts to suit local conditions. Alter duct sizes on basis of equal friction where required to facilitate installation.
21. Provide ductwork connected to air-handling equipment or air inlet and outlet devices, with all necessary transformation pieces, flexible fabric connections as required. Secure fabric connectors tightly to fans, casings and ducts. Allow at least 1" slack in connections. Do not paint fabric connectors. Provide galvanized steel weather shield over exterior top and sides of exposed flexible connections.

22. Diagonally or transversely cross break all panels on metal rectangular ducts over 18" in either direction.
23. Avoid penetration of ducts. Provide airtight rubber grommets at unavoidable penetrations of hanger rods.
24. Duct Openings: Provide openings where required to accommodate thermometers, smoke detectors, controllers, etc.
25. Provide pitot tube openings where required for testing of systems: Complete with metal cap with spring device or screw to ensure against air leakage.
26. Where openings are provided in insulated ductwork, install insulation material inside metal ring.

3.10 GREASE EXHAUST DUCTS

- A. Construct as required with Section 510 of the 2016 California Mechanical Code.
- B. Ducts shall be constructed of and supported by carbon steel not less than 0.054 inches (16 gauge) in thickness or type 316 stainless steel not less than 0.043 inches (18 gauge) in thickness.
- C. Seams, joints, penetrations, and duct-to-hood collar connections shall have a liquid-tight continuous external weld. Exceptions to weld as per Section 510.5.2 Exceptions.
- D. Construct and install so grease cannot become pocketed in any portion. Slope duct 1/4-inch per foot down toward hood if less than 75 feet of horizontal duct run. Slope of 1" per foot when more than 75 feet of horizontal duct run. Only if slope is impossible due to structural or architectural space limitations, slope in direction of air flow to low-point drain. Provide 1-inch drain from all low points to nearest air gap waste. Drain to have S trap for water seal.
- E. Do not cross break bottom panels of duct.
- F. Securely fasten in place at every change in direction. No penetration of any duct wall.
- G. Enclose ducts penetrating a ceiling, wall or floor from the point of penetration to the outside by the general contractor.
- H. Provide access doors in duct at maximum 10 feet intervals and at each change in direction.
- I. For cleanout openings located in ducts within a fire-resistive shaft or enclosure, provide access openings in shaft or enclosure at each cleanout point. These access openings shall provide direct access to duct with work platforms provided where required.

3.11 DISHWASHER EXHAUST AND SPECIALTY PLENUMS

- A. Entire length of dishwasher exhaust and 10-feet downstream of in-line humidifiers: continuously welded stainless steel, slopes and drains as for grease duct, or aluminum continuously soldered or welded.
- B. Slope duct 1/4-inch per foot down toward equipment if less than 75 feet of horizontal duct run. 1" per foot when more than 75 feet of horizontal duct run. Only if is impossible due to structural or architectural space limitations, slope in direction of air flow to low-point drain. Provide 1-inch drain from all low points to nearest air gap waste. Drain to have S trap for water seal.
- C. Do not cross break bottom panel of duct.

3.12 FUME HOOD EXHAUST

- A. Entire length stainless steel continuous welded liquid tight.
- B. Slope duct 1/4-inch per foot down toward equipment. Only if above slope is impossible due to structural or architectural space limitations, slope in direction of air flow to low-point drain. Provide 1-inch drain from all low points to nearest air gap waste. Drain to have S trap for water seal.
- C. Do not cross break bottom panel of duct.

3.13 ALUMINUM DUCTWORK

- A. One gauge heavier than galvanized steel.

END OF SECTION

SECTION 23 33 00 – AIR DUCT ACCESSORIES

1.0 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Backdraft dampers.
 - 2. Manual volume dampers.
 - 3. Turning vanes.
 - 4. Duct-mounted access doors.
 - 5. Flexible connectors.
 - 6. Flexible ducts.
 - 7. Duct accessory hardware.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Submittals:
 - 1. Documentation indicating that units comply with ASHRAE 62.1-2010, Section 5 - "Systems and Equipment."
 - 2. Documentation indicating that duct insulation R-values comply with tables in ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air Conditioning."
- C. Operation and maintenance data.

1.3 QUALITY ASSURANCE

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with AMCA 500-D testing for damper rating.

2.0 PRODUCTS

2.1 MATERIALS

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
 - 1. Galvanized Coating Designation: G60.
 - 2. Exposed-Surface Finish: Mill phosphatized.
- C. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts.
- D. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.2 BACKDRAFT DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Air Balance Inc.; a division of Mestek, Inc.
 - 2. American Warming and Ventilating; a division of Mestek, Inc.
 - 3. Duro Dyne Inc.
 - 4. Greenheck Fan Corporation.
 - 5. Nailor Industries Inc.
 - 6. Pottorff; a division of PCI Industries, Inc.
 - 7. Ruskin Company.
- B. Description: Gravity balanced.
- C. Maximum Air Velocity: 2000 fpm.
- D. Maximum System Pressure: 2-inch wg.
- E. Frame: 0.052-inch thick, galvanized sheet steel.
- F. Blades: Multiple single-piece blades, center-pivoted, maximum 6-inch width, resistant with sealed edges.
- G. Blade Action: Parallel.
- H. Blade Seals: Neoprene, mechanically locked.

- I. Blade Axles:
 - 1. Material: Galvanized steel.
 - 2. Diameter: 0.20 inch.
- J. Tie Bars and Brackets: Galvanized steel.
- K. Return Spring: Adjustable tension.
- L. Accessories:
 - 1. Adjustment device to permit setting for varying differential static pressure.
 - 2. Counterweights and spring-assist kits for vertical airflow installations.
 - 3. Electric actuators.
 - 4. Chain pulls.
 - 5. Screen Mounting: Front mounted in sleeve.
 - a. Sleeve Thickness: 20-gage minimum.
 - b. Sleeve Length: 6 inches minimum.
 - 6. Screen Mounting: Rear mounted.
 - 7. Screen Material: Galvanized steel or Aluminum.
 - 8. Screen Type: Insect.
 - 9. 90-degree stops.

2.3 MANUAL VOLUME DAMPERS

- A. Standard, Steel, Manual Volume Dampers:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Air Balance Inc.; a division of Mestek, Inc.
 - b. American Warming and Ventilating; a division of Mestek, Inc.
 - c. Flexmaster U.S.A., Inc.
 - d. McGill AirFlow LLC.
 - e. METALAIRE, Inc.
 - f. Nailor Industries Inc.

- g. Pottorff; a division of PCI Industries, Inc.
 - h. Ruskin Company.
 - i. Vent Products Company, Inc.
 - 2. Standard leakage rating, with linkage outside airstream.
 - 3. Suitable for horizontal or vertical applications.
 - 4. Frames:
 - a. Hat-shaped, galvanized-steel channels, 0.064-inch minimum thickness.
 - b. Mitered and welded corners.
 - c. Flanges for attaching to walls and flangeless frames for installing in ducts.
 - 5. Blades:
 - a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Galvanized-steel, 0.064 inch thick.
 - 6. Blade Axles: Galvanized steel.
 - 7. Tie Bars and Brackets: Galvanized steel.
 - B. Jackshaft:
 - 1. Size: 1-inch diameter.
 - 2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
 - 3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.
 - C. Damper Hardware:
 - 1. Zinc-plated, die-cast core with dial and handle made of 3/32-inch- thick zinc-plated steel, and a 3/4-inch hexagon locking nut.
 - 2. Include center hole to suit damper operating-rod size.

3. Include elevated platform for insulated duct mounting.

2.4 FIRE DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Air Balance Inc.; a division of Mestek, Inc.
 2. Greenheck Fan Corporation.
 3. McGill AirFlow LLC.
 4. METALAIRE, Inc.
 5. Nailor Industries Inc.
 6. Pottorff; a division of PCI Industries, Inc.
 7. Prefco; Perfect Air Control, Inc.
 8. Ruskin Company.
 9. Vent Products Company, Inc.
- B. Type: Dynamic; rated and labeled according to UL 555 by an NRTL.
- C. Closing rating in ducts up to 4-inch wg static pressure class and minimum 4000-fpm velocity.
- D. Fire Rating: 1-1/2 hours.
- E. Frame: Multiple-blade type; fabricated with roll-formed, 0.034-inch- thick galvanized steel; with mitered and interlocking corners.
- F. Mounting Sleeve: Factory- or field-installed, galvanized sheet steel.
 1. Minimum Thickness: 0.052 inch thick, as indicated, and of length to suit application.
 2. Exception: Omit sleeve where damper-frame width permits direct attachment of perimeter mounting angles on each side of wall or floor; thickness of damper frame must comply with sleeve requirements.
- G. Mounting Orientation: Vertical or horizontal as indicated.
- H. Blades: Roll-formed, interlocking, 0.034-inch- thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch- thick, galvanized-steel blade connectors.

- I. Not all manufacturers use blade locks for horizontal units.
- J. Horizontal Dampers: Include blade lock and stainless-steel closure spring.
- K. Heat-Responsive Device: Replaceable, 165 deg F rated, fusible links.
- L. Heat-Responsive Device: Electric resettable link and switch package, factory installed, 165 deg F.

2.5 SMOKE DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Air Balance Inc.; a division of Mestek, Inc.
 - 2. Greenheck Fan Corporation.
 - 3. Nailor Industries Inc.
 - 4. Ruskin Company.
- B. General Requirements: Label according to UL 555S by an NRTL.
- C. Smoke Detector: Integral, factory wired for single-point connection. Shall be furnished under Section 28 31 00, Fire Detection and Alarm, 120V, 1Ø for factory installation.
- D. Frame: Multiple-blade type; fabricated with roll-formed, 0.034-inch- thick galvanized steel; with mitered and interlocking corners.
- E. Blades: Roll-formed, horizontal, interlocking, 0.034-inch- thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch- thick, galvanized-steel blade connectors.
- F. Leakage: Class I.
- G. Rated pressure and velocity to exceed design airflow conditions.
- H. Mounting Sleeve: Factory-installed, 0.052-inch- thick, galvanized sheet steel; length to suit wall.
- I. Damper Motors: two-position action.
- J. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."

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 23 Section "Instrumentation and Control for HVAC."
 3. Permanent-Split-Capacitor or Shaded-Pole Motors: With oil-immersed and sealed gear trains.
 4. Spring-Return Motors: Equip with an integral spiral-spring mechanism where indicated. Enclose entire spring mechanism in a removable housing designed for service or adjustments. Size for running torque rating of 150 in. x lbf and breakaway torque rating of 150 in. x lbf.
 5. Electrical Connection: 120 V, single phase, 60 Hz.
- K. Accessories:
1. Auxiliary switches for signaling position indication.
 2. Test and reset switches, damper mounted.

2.6 TURNING VANES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Ductmate Industries, Inc.
 2. Duro Dyne Inc.
 3. METALAIRE, Inc.
 4. SEMCO Incorporated.
- B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
- C. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
- D. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows."
- E. Vane Construction: Single.

2.7 DUCT-MOUNTED ACCESS DOORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. American Warming and Ventilating; a division of Mestek, Inc.
 2. Ductmate Industries, Inc.
 3. Flexmaster U.S.A., Inc.
 4. Greenheck Fan Corporation.
 5. McGill AirFlow LLC.
 6. Nailor Industries Inc.
 7. Pottorff; a division of PCI Industries, Inc.
 8. Ventfabrics, Inc.
- B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 7-2, "Duct Access Doors and Panels," and 7-3, "Access Doors - Round Duct."
1. Door:
 - a. Double wall, rectangular.
 - b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
 - c. Vision panel.
 - d. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
 - e. Fabricate doors airtight and suitable for duct pressure class.
 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
 3. Number of Hinges and Locks:
 - a. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
 - b. Access Doors up to 18 Inches Square: Two hinges and two sash locks.

2.8 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ductmate Industries, Inc.
 2. Duro Dyne Inc.
 3. Ventfabrics, Inc.
- B. Materials: Flame-retardant or noncombustible fabrics.
- C. Coatings and Adhesives: Comply with UL 181, Class 1.
- D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to 2 strips of 2-3/4-inch- wide, 0.028-inch- thick, galvanized sheet. Provide metal compatible with connected ducts.
- E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
1. Minimum Weight: 26 oz./sq. yd..
 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
 3. Service Temperature: Minus 40 to plus 200 deg F.

2.9 FLEXIBLE DUCTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Flexmaster U.S.A., Inc.
 2. McGill AirFlow LLC.
 3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Noninsulated, Flexible Duct: UL 181, Class 1, black polymer film supported by helically wound, spring-steel wire.
1. Pressure Rating: 4-inch wg positive and 0.5-inch wg negative.
 2. Maximum Air Velocity: 4000 fpm.
 3. Temperature Range: Minus 20 to plus 175 deg F.
- C. Insulated, Flexible Duct: UL 181, Class 1, black polymer film supported by helically wound, spring-steel wire; fibrous-glass insulation; polyethylene vapor-barrier film.
1. Pressure Rating: 4-inch wg positive and 0.5-inch wg negative.
 2. Maximum Air Velocity: 4000 fpm.

3. Temperature Range: Minus 20 to plus 175 deg F.
4. Insulation R-Value: Comply with ASHRAE/IESNA 90.1-2004 tables titled "Minimum Duct Insulation R-Value, Cooling and Heating Only Supply Ducts and Return Ducts" and "Minimum Duct Insulation R-Value, Combined Heating and Cooling Supply Ducts and Return Ducts."

D. Flexible Duct Connectors:

1. Clamps: Nylon strap in sizes 3 through 18 inches, to suit duct size.

2.10 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.
- B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

3.0 EXECUTION

3.1 INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized.
- C. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
- D. Set dampers to fully open position before testing, adjusting, and balancing.
- E. Install test holes at fan inlets and outlets and elsewhere as indicated.
- F. Install fire and/or smoke dampers according to UL listing.
- G. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
 1. On both sides of duct coils.
 2. Upstream from duct filters.
 3. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.

4. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links shall be pressure relief access doors; and shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
 5. Control devices requiring inspection.
 6. Elsewhere as indicated.
- H. Install access doors with swing against duct static pressure.
- I. Access Door Sizes:
1. One-Hand or Inspection Access: 8 by 5 inches.
 2. Two-Hand Access: 12 by 6 inches.
 3. Head and Hand Access: 18 by 10 inches.
 4. Head and Shoulders Access: 21 by 14 inches.
 5. Body Access: 25 by 14 inches.
 6. Body plus Ladder Access: 25 by 17 inches.
- J. Label access doors according to Division 23 Section "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.
- K. Install flexible connectors to connect ducts to equipment. Outdoor flexible connectors will be covered by a 6" wide galvanized sheet metal covering over the top and vertical sides.
- L. Flexible duct shall not be used as a fitting. All fitting shall be galvanized ductwork.
- M. Connect flexible ducts to metal ducts with draw bands.
- N. Install duct test holes where required for testing and balancing purposes.
- 3.2 FIELD QUALITY CONTROL
- A. Tests and Inspections:
1. Operate dampers to verify full range of movement.
 2. Inspect locations of access doors and verify that purpose of access door can be performed.
 3. Operate fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.

Project: 855 East Laurel Drive Emergency Shelter
Project No. 8875
Bid No. 10736

4. Inspect turning vanes for proper and secure installation.

END OF SECTION

SECTION 23 34 23 – HVAC POWER VENTILATORS

1.0 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Centrifugal wall ventilators.
2. Ceiling-mounted ventilators.
3. In-line centrifugal fans.

1.2 PERFORMANCE REQUIREMENTS

A. Project Altitude: Base fan-performance ratings on sea level.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Also, include the following:

1. Certified fan performance curves with system operating conditions indicated.
2. Certified fan sound-power ratings.
3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
4. Material thickness and finishes, including color charts.
5. Dampers, including housings, linkages, and operators.

B. Operation and Maintenance Data: For power ventilators to include in emergency, operation, and maintenance manuals.

1.4 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. AMCA Compliance: Fans shall have AMCA-Certified performance ratings and shall bear the AMCA-Certified Ratings Seal.

C. UL Standards: Power ventilators shall comply with UL 705. Power ventilators for use for restaurant kitchen exhaust shall also comply with UL 762.

1.5 COORDINATION

- A. Coordinate size and location of structural-steel support members.
- B. Coordinate sizes and locations of wall openings, equipment supports, and penetrations with actual equipment provided.

2.0 PRODUCTS

2.1 CENTRIFUGAL WALL VENTILATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Aerovent; a division of Twin City Fan Companies, Ltd.
 - 2. Greenheck Fan Corporation.
 - 3. Loren Cook Company.
 - 4. PennBarry.
 - 5. W.W. Grainger, Inc.; Dayton Products.
- B. Housing: Heavy-gage, removable, spun-aluminum or galvanized steel, dome top and outlet baffle; venturi inlet cone.
- C. Fan Wheel: Aluminum hub and wheel with backward-inclined blades.
- D. Belt Drives:
 - 1. Resiliently mounted to housing.
 - 2. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
 - 3. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
 - 4. Pulleys: Cast-iron, adjustable-pitch motor pulley.
 - 5. Fan and motor isolated from exhaust airstream.

2.2 CEILING-MOUNTED VENTILATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Broan-NuTone LLC.
 - 2. Broan-NuTone LLC; NuTone Inc.

3. Greenheck Fan Corporation.
 4. Loren Cook Company.
 5. PennBarry.
 6. W.W. Grainger, Inc.; Dayton Products.
- B. Housing: Steel, lined with acoustical insulation.
- C. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.
- D. Grille: Plastic louvered grille with flange on intake and thumbscrew attachment to fan housing.
- E. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.
- F. Accessories:
1. Humidity Sensor: Humidity detector with adjustable shutoff timer
 2. Motion Sensor: Motion detector with adjustable shutoff timer.
 3. Isolation: Rubber-in-shear vibration isolators.
 4. Manufacturer's standard roof jack or wall cap, and transition fittings.

2.3 IN-LINE CENTRIFUGAL FANS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Greenheck Fan Corporation.
 2. Loren Cook Company.
 3. PennBarry.
- B. Housing: Split, spun aluminum with aluminum straightening vanes, inlet and outlet flanges, and support bracket adaptable to floor, side wall, or ceiling mounting.
- C. Direct-Drive Units: Motor mounted in airstream, factory wired to disconnect switch located on outside of fan housing.
- D. Motors: EMS with dial-on-motor and constant CFM capabilities with remote static pressure sensor.
- E. Fan Wheels: Aluminum, airfoil blades welded to aluminum hub.

F. Accessories:

1. Filter housing and assembly with MERV 8 filters.
2. Companion Flanges: For inlet and outlet duct connections.

2.4 MOTORS

- A. 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.
- B. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Division 26 Sections.

2.5 SOURCE QUALITY CONTROL

- A. Certify sound-power level ratings according to AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.
- B. Certify fan performance ratings, including flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests according to AMCA 210, "Laboratory Methods of Testing Fans for Aerodynamic Performance Rating." Label fans with the AMCA-Certified Ratings Seal.

3.0 EXECUTION

3.1 INSTALLATION

- A. Install power ventilators level and plumb.
- B. Ceiling Units: Suspend units from structure; use steel wire or metal straps.
- C. Install units with clearances for service and maintenance.
- D. Label units according to requirements specified in Division 23 Section "Identification for HVAC."

3.2 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. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

A. 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.

B. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Prepare test and inspection reports.

3.4 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 HVAC" 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 37 13 – DIFFUSERS, REGISTERS & GRILLES

1.0 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Square plaque ceiling diffusers.
2. Adjustable bar registers and grilles.

B. Related Sections:

1. Division 23 Section "Air Duct Accessories" for volume-control dampers not integral to diffusers, registers, and grilles.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated, include the following:

1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

2.0 PRODUCTS

2.1 GENERAL

A. Basis-of-Design Product: Subject to compliance with requirements, provide Titus or comparable product by one of the following:

1. Titus.
2. METALAIRE, Inc.
3. Nailor Industries Inc.
4. Price Industries.
5. Tuttle & Bailey.

2.2 CEILING DIFFUSERS

A. Square Ceiling Diffusers:

1. Devices shall be specifically designed for variable-air-volume flows.

2. Material: Steel or Aluminum.
3. Finish: Baked enamel, white
4. Face Style: Plaque.
5. Mounting: Surface or T-bar as indicated.
6. Pattern: Adjustable.
7. Accessories:
 - a. Directional blow insert.

2.3 REGISTERS AND GRILLES

A. Adjustable Bar Register:

1. Material: Steel or Aluminum.
2. Finish: Baked enamel, white

B. Adjustable Bar Grille:

1. Material: Steel or Aluminum.
2. Finish: Baked enamel, white.

3.0 EXECUTION

3.1 INSTALLATION

- A. Install diffusers, registers, and grilles level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.2 ADJUSTING

- A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION

SECTION 23 81 27 – VRV HEAT PUMP

1.0 GENERAL

1.1 SUMMARY

A. Section Includes:

1. VRV Heat Pump Condensing Units.

1.2 SUBMITTAL

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

1. For refrigerants, documentation including printed statement that refrigerants are free of HCFCs.
2. Documentation indicating that units comply with ASHRAE 62.1-2004, Section 5 - "Systems and Equipment."
3. Operation and maintenance data,
4. Warranty

1.3 SYSTEM DESCRIPTION

- A. The variable capacity, heat pump air conditioning system shall be a Daikin Variable Refrigerant Volume Series (heat and cool model) split system as specified.
- B. The system shall consist of multiple evaporators using PID control, REFNET™ joints and headers or REFLOK mechanical fittings, a two-pipe refrigeration distribution system using PID control and Daikin VRV® condenser unit.
- C. The condenser shall be a direct expansion (DX), air-cooled heat pump, multi-zone air-conditioning system with variable speed inverter driven compressors using R-410A refrigerant.
- D. The condensing unit may connect an indoor evaporator capacity up to 200% of the condensing unit capacity. All zones are each capable of operating separately with individual temperature control.
- E. A dedicated hot gas pipe shall be required to ensure optimum heating operation performance. Two-pipe, heat recovery systems utilizing a lower temperature mixed liquid/gas refrigerant to perform heat recovery are not acceptable due to reduced heating capabilities. Aluminum or Copper maybe used for refrigerant piping between indoor and outdoor units.
- F. The Daikin condensing unit shall be interconnected to DX coils utilizing the EEV kit in accordance with Daikin's engineering data book detailing each available indoor

unit. The indoor units shall be connected to the condensing unit utilizing Daikin's REFNET™ specified piping joints and headers to ensure correct refrigerant flow and balancing. T style joints are not acceptable.

- G. Operation of the systems shall permit either heating or cooling of all the indoor units simultaneously. Each indoor unit or group of indoor units shall be able to provide set temperature independently via a local remote controller, an Intelligent Manager.
- H. Substitutions: The HVAC equipment basis of design is Daikin AC. All bidders shall furnish the minimum system standards as defined by the base bid model numbers, model families or as otherwise specified herein (see Key General Specifications Alternate Supplier Checklist). In any event, the contractor shall be responsible for all specified items and intents of this document without further compensation.

1.4 QUALITY ASSURANCE

- A. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL), in accordance with ANSI/UL 1995 – Heating and Cooling Equipment and bear the Listed Mark.
- B. All wiring shall be in accordance with the National Electric Code (NEC).
- C. The system will be produced in an ISO 9001 and ISO 14001 facility, which are standards set by the International Standard Organization (ISO). The system shall be factory tested for safety and function.
- D. Mechanical equipment for wind-born debris regions shall be designed in accordance with ASCE 7-2010 and installed to resist the wind pressures on the equipment and the supports.
- E. The condensing unit will be factory charged with R-410A.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Unit shall be stored and handled according to the manufacturer's recommendations.

1.6 WARRANTY

- A. Daikin AC (Americas), Inc. ("Daikin AC") warrants to the customer who is the original owner and user of the Daikin AC products specified above ("Customer") that under normal use and maintenance for comfort cooling and conditioning applications such products (the "Products") will be free from defects in material or workmanship. This warranty applies to parts and compressors is limited in duration to ten (10) years from the earlier to occur of (a) the date of original installation, whether or not actual use begins on that date, or (b) eighteen (18) months from the date of shipment by Daikin AC. Customer must present proof of the original date of receipt and of installation of the Product in order to establish the effective date of this warranty. Otherwise the effective date will be deemed to be the date of manufacture plus sixty (60) days. Repaired or replacement parts are warranted for the balance of the

warranty period applicable to the original part following the date on which the repaired or replacement part is provided to the Customer.

- B. For Labor: Five years from date of Submittal.

2.0 PRODUCTS

2.1 SYSTEM FEATURES

- A. Voltage Platform – Heat Pump condensing units shall be available with a 208V/3/60 power supply.
- B. Advanced Zoning - A single system shall provide for up to 64 zones.
- C. Independent Control - Each indoor unit shall use a dedicated electronic expansion valve with 2000 positions for independent control.
- D. VFD Inverter Control and Variable Refrigerant Temperature - Each condensing unit shall use high efficiency, variable speed all “inverter” compressor(s) coupled with inverter fan motors to optimize part load performance. The system capacity and refrigerant temperatures shall be modulated automatically to set suction and condensing pressures while varying the refrigerant volume for the needs of the cooling or heating loads. The control will be automatic and customizable depending on load and weather conditions.
 - 1. Indoor shall use PID to control superheat to deliver a comfortable room temperature condition and optimize efficiency.
- E. Configurator software - Each system shall be available with configurator software package to allow for remote configuration of operational settings and also for assessment of operational data and error codes.
 - 1. If this software is not provided by an alternate manufacturer, for each individual outdoor unit the contractor shall do the settings manually and keep detailed records for future maintenance purposes.
- F. Autocharging - Each system shall have a refrigerant auto-charging function.
- G. Flexible Design –
 - 1. Systems shall be capable of up to 540ft (165m) [623 ft. (190m) equivalent] of linear piping between the condensing unit and furthest located indoor unit.
 - 2. Systems shall be capable of up to 3,280ft (1,000m) total “one-way” piping in the piping network.
 - 3. Systems shall have a vertical (height) separation of up to 295ft between the condensing unit and the indoor units.

4. Systems shall be capable of up to 295ft (90m) from the first REFNET™ / branch point.
 5. The condensing unit shall have the ability to connect an indoor unit evaporator capacity of up to 200% of the condensing unit nominal capacity.
 6. Systems shall be capable of 98ft (30m) vertical separation between indoor units.
 7. Condensing units shall be supported with a fan motor ESP up to 0.32" WG as standard to allow connection of discharge ductwork and to prevent discharge air short circuiting.
- H. Oil Return – Each system shall be furnished with a centrifugal oil separator and active oil recovery cycle.
- I. Simple wiring – Systems shall use 16/18 AWG, 2 wire, stranded, non-shielded and non-polarized daisy chain control wiring.
- J. Space saving – Each system shall have a condensing unit module footprint no larger than 48-7/8" x 30-3/16" (1694mm x 1242mm x 767mm).
- K. Advanced diagnostics – Systems shall include a self-diagnostic, auto-check function to detect a malfunction and display the type and location.
- L. Each condensing unit shall incorporate contacts for electrical demand shedding with optional 3 stage demand control with 12 customizable demand settings.
- M. Advanced controls – Each system shall have at least one remote controller capable of controlling up to 16 indoor units.
- N. Each system shall be capable of integrating with open protocol BACnet and LonWorks building management systems.
- O. Low sound levels - Each system shall use indoor and condensing units with quiet operation as low as 27 dB(A).

2.2 CONDENSING UNIT

- A. General: The condensing unit is designed specifically for use with VRV-IV series components.
1. The condensing unit shall be factory assembled and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of Daikin scroll compressors, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separators, service ports and refrigerant regulator.

2. High/low pressure gas line, liquid and suction lines must be individually insulated between the condensing and indoor units.
3. The condensing unit can be wired and piped with access from the left, right, rear or bottom.
4. The connection ratio of indoor units to condensing unit shall be permitted up to 200%.
5. Each condensing system shall be able to support the connection of up to 56 indoor units dependent on the model of the condensing unit.
6. The sound pressure level standard shall be that value as listed in the Daikin engineering manual for the specified models at 3 feet from the front of the unit. The condensing unit shall be capable of operating automatically at further reduced noise during night time.
7. The system will automatically restart operation after a power failure and will not cause any settings to be lost, thus eliminating the need for reprogramming.
8. The unit shall incorporate an auto-charging feature.
9. The condensing unit shall be modular in design and should allow for side-by-side installation with minimum spacing.
10. The following safety devices shall be included on the condensing unit; high pressure sensor and switch, low pressure sensor, control circuit fuses, crankcase heaters, fusible plug, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.
11. To ensure the liquid refrigerant does not flash when supplying to the various indoor units, the circuit shall be provided with a sub-cooling feature.
12. Oil recovery cycle shall be automatic occurring 2 hours after start of operation and then every 8 hours of operation. Each system shall maintain continuous heating during oil return operation. Reverse cycle (cooling mode) oil return during heating operation shall not be permitted due to the potential reduction in space temperature.
13. The condensing unit shall be capable of heating operation at 0°F dry bulb ambient temperature without additional low ambient controls or an auxiliary heat source.
14. The system shall continue to provide heat to the indoor units in heating operation while in the defrost mode. Reverse cycle (cooling mode) defrost during heating operation shall not be permitted due to the potential reduction in space temperature.

B. Unit Cabinet:

1. The condensing unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.

C. Fan:

1. The condensing unit shall consist of one or more propeller type, direct-drive 350 or 750 W fan motors that have multiple speed operation via a DC (digitally commutating) inverter.
2. The condensing unit fan motor shall have multiple speed operation of the DC (digitally commutating) inverter type, and be of high external static pressure and shall be factory set as standard at 0.12 in. WG. A field setting switch to a maximum 0.32 in. WG pressure is available to accommodate field applied duct for indoor mounting of condensing units.
3. The fan shall be a vertical discharge configuration with a nominal airflow maximum range of 6,700 CFM to 20,650 CFM dependent on model specified.
4. Nominal sound pressure levels shall be as shown below.
5. The fan motor shall have inherent protection and permanently lubricated bearings and be mounted.
6. The fan motor shall be provided with a fan guard to prevent contact with moving parts.
7. Night setback control of the fan motor for low noise operation by way of automatically limiting the maximum speed shall be a standard feature. Operation sound level shall be selectable from 3 steps as shown below.

D. Condenser Coil:

1. The condenser coil shall be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The heat exchanger coil shall be of a waffle louver fin and rifled bore tube design to ensure high efficiency performance.
3. The heat exchanger on the condensing units shall be manufactured from Hi-X seamless copper tube with N-shape internal grooves mechanically bonded on to aluminum fins to an e-Pass Design.
4. The fins are to be covered with an anti-corrosion acrylic resin and hydrophilic film type E1.

5. The pipe plates shall be treated with powdered polyester resin for corrosion prevention. The thickness of the coating must be between 2.0 to 3.0 microns.

E. Compressor:

1. The Daikin inverter scroll compressors shall be variable speed (PVM inverter) controlled which is capable of changing the speed to follow the variations in total cooling and heating load as determined by the suction gas pressure as measured in the condensing unit.
2. In addition, samplings of evaporator and condenser temperatures shall be made so that the high/low pressures detected are read every 20 seconds and calculated. With each reading, the compressor capacity (INV frequency or STD ON/OFF) shall be controlled to eliminate deviation from target value.
 - a. Non-inverter-driven compressors, which may cause starting motor current to exceed the nominal motor current (RLA) and require larger wire sizing, shall not be allowed.
3. The inverter driven compressor in each condensing unit shall be of highly efficient reluctance DC (digitally commutating), hermetically sealed scroll “G2-type” with a maximum speed of 7,980 rpm.
4. Neodymium magnets shall be adopted in the rotor construction to yield a higher torque and efficiency in the compressor instead of the normal ferrite magnet type.
5. At complete stop of the compressor, the neodymium magnets will position the rotor into the optimum position for a low torque start.
6. The capacity control range shall be as low as 4% to 100%.
7. Each non-inverter compressor shall also be of the hermetically sealed scroll type.
8. Each compressor shall be equipped with a crankcase heater, high pressure safety switch, and internal thermal overload protector.
9. Oil separators shall be standard with the equipment together with an intelligent oil management system.
10. The compressor shall be spring mounted to avoid the transmission of vibration.
11. In the event of compressor failure, the remaining compressors shall continue to operate and provide heating or cooling as required at a proportionally reduced capacity. The microprocessor and associated controls shall be manually activated to specifically address this condition for single module and manifolded systems.

12. In the case of multiple condenser modules, conjoined operation hours of the compressors shall be balanced by means of the Duty Cycling Function, ensuring sequential starting of each module at each start/stop cycle, completion of oil return, completion of defrost or every 8 hours.

F. Electrical:

1. The power supply to the condensing unit shall be 460 volts, 3 phase, 60 hertz +/- 10%.

2.3 REFRIGERANT PIPING

- A. The system shall be capable of refrigerant piping up to 540 actual feet or 620 equivalent feet from the condensing unit to the furthest indoor unit, a total combined liquid line length of 3,280 feet of piping between the condensing and indoor units with 295 feet maximum vertical difference, without any oil traps. REFNET™ piping joints and headers shall be used to ensure proper refrigerant balance and flow for optimum system capacity and performance. T style joints shall not be acceptable as this will negatively impact proper refrigerant balance and flow for optimum system capacity and performance.
- B. Refer to Section 23 Refrigerant Piping.

3.0 EXECUTION

3.1 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. Factory-authorized representative shall witness and record installation and shall assist in submission of performance testing for Commissioning.
- B. Complete installation and startup check according to manufacturer's written instructions and do the following:
 1. Inspect for visible damage to unit casing.
 2. Inspect for visible damage to compressor, coils, and fans.
 3. Inspect internal insulation.
 4. Verify that labels are clearly visible.
 5. Verify that clearances have been provided for servicing.
 6. Verify that controls are connected and operable.

7. Verify that filters are installed.
8. Clean condenser coil and inspect for construction debris.
9. Connect and purge gas line.
10. Remove packing from vibration isolators.
11. Adjust fan belts to proper alignment and tension.
12. Start unit according to manufacturer's written instructions.
 - a. Start refrigeration system.
 - b. Do not operate below recommended low-ambient temperature.
 - c. Complete startup sheets and attach copy with Contractor's startup report.
13. Inspect and record performance of interlocks and protective devices; verify sequences.
14. Operate unit for an initial period as recommended or required by manufacturer.
15. Calibrate thermostats/sensors.
16. Inspect outdoor-air dampers for proper stroke and interlock with return-air dampers.
17. Start refrigeration system and measure and record the following when ambient is a minimum of 15 F above return-air temperature:
 - a. Coil leaving-air, dry- and wet-bulb temperatures.
 - b. Coil entering-air, dry- and wet-bulb temperatures.
 - c. Outdoor-air, dry-bulb temperature.
 - d. Outdoor-air-coil, discharge-air, dry-bulb temperature.
18. Inspect controls for correct sequencing of heating, outside air interlocks, dampers, and refrigeration, and normal and emergency shutdown.
19. After startup and performance testing and prior to Substantial Completion, replace existing filters with new filters.

C. Tests and Inspections:

1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Prepare test and inspection reports.

3.2 INSTALLATION REQUIREMENTS

- A. The system must be installed by a Daikin factory trained contractor/dealer. The bidders shall be required to submit training certification proof with bid documents. The mechanical contractor's installation price shall be based on the systems installation requirements. The mechanical contractor bids with complete knowledge of the HVAC system requirements. Untrained contractors who wish to bid this project may contact manufacturer's rep to arrange training prior to bid day.
- B. Install unit(s) level and plumb.
- C. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.
- D. Install and connect pre-charged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.
- C. Duct Connections: Duct installation requirements are specified in Division 23 Section "Metal Ducts". Drawings indicate the general arrangement of ducts. Duct connections shall be made with flexible duct connectors. Flexible duct connectors are specified in Division 23 Section "Air Duct Accessories."

3.4 CLEANING AND ADJUSTING

- A. After completing system installation and testing, adjusting, and balancing RTU and air-distribution systems, clean filter housings and install new filters.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain VRS. Refer to Division 01 Section "Demonstration and Training."

- B. Remove and replace malfunctioning units and retest as specified above.
- C. Prepare test and inspection reports.

END OF SECTION

SECTION 23 81 27 – VRV HEAT RECOVERY

1.0 GENERAL

1.1 SUMMARY

- A. Section includes the outdoor section of a variable capacity, heat recovery air conditioning system (VRV HEAT RECOVERY).

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. For refrigerants, documentation including printed statement that refrigerants are free of HCFCs.
 - 2. Documentation indicating that units comply with ASHRAE 62.1-2004, Section 5 - "Systems and Equipment."
 - 3. Operation and maintenance data,
 - 4. Warranty

1.3 SYSTEM DESCRIPTION

- A. The variable capacity, heat recovery air conditioning system shall be a Daikin Variable Refrigerant Volume Series (heat and cool model) split system as specified. The system shall consist of multiple evaporators, branch selector boxes, REFNET™ joints and headers or REFLOK mechanical fittings, a three-pipe refrigeration distribution system using PID control and Daikin VRV® condenser unit. The condenser shall be a direct expansion (DX), air-cooled heat recovery, multi-zone air-conditioning system with variable speed inverter driven compressors using R-410A refrigerant. The condensing unit may connect an indoor evaporator capacity up to 200% of the condensing unit capacity. All zones are each capable of operating separately with individual temperature control. A dedicated hot gas pipe shall be required to ensure optimum heating operation performance. Two-pipe, heat recovery systems utilizing a lower temperature mixed liquid/gas refrigerant to perform heat recovery are not acceptable due to reduced heating capabilities. Aluminum or Copper may be used for refrigerant piping between indoor and outdoor units.
- B. The Daikin condensing unit shall be interconnected to indoor unit models FXFQ, FXHQ, FXMQ, FXLQ, FXNQ, FXTQ, FXDQ, FXZQ, FXAQ and FXMQ_MF and shall range in capacity from 7,500 Btu/h to 96,000 Btu/h in accordance with Daikin's engineering data book detailing each available indoor unit. The indoor units shall be connected to the condensing unit utilizing Daikin's REFNET™ specified piping joints and headers to ensure correct refrigerant flow and balancing. T style joints are not acceptable.

- C. Operation of the system shall permit either individual cooling or heating of each indoor unit simultaneously or all of the indoor units associated with each branch of the cool/heat selector box (BSVQ_P / BSV4Q_P / BSV6Q_P). Each indoor unit or group of indoor units shall be able to provide set temperature independently via a local remote controller, an Intelligent Controller, an Intelligent Manager or a BMS interface.
- D. Branch selector boxes shall be located as shown on the drawing. The branch selector boxes shall have the capacity to control up to 216 MBH (cooling) downstream of the branch selector box. Each branch of the branch selector box shall consist of five electronic expansion valves, refrigerant control piping and electronics to facilitate communications between the box and main processor and between the box and indoor units. The branch selector box shall control the operational mode of the subordinate indoor units. The use of five EEV's ensures continuous heating during defrost, no heating impact during changeover and reduced sound levels. The use of solenoid valves for changeover and pressure equalization shall not be acceptable due to refrigerant noise.
- E. Substitutions: The HVAC equipment basis of design is Daikin AC. All bidders shall furnish the minimum system standards as defined by the base bid model numbers, model families or as otherwise specified herein (see Key General Specifications Alternate Supplier Checklist). In any event, the contractor shall be responsible for all specified items and intents of this document without further compensation.

1.4 QUALITY ASSURANCE

- A. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL), in accordance with ANSI/UL 1995 – Heating and Cooling Equipment and bear the Listed Mark.
- B. All wiring shall be in accordance with the National Electric Code (NEC).
- C. The system will be produced in an ISO 9001 and ISO 14001 facility, which are standards set by the International Standard Organization (ISO). The system shall be factory tested for safety and function.
- D. Mechanical equipment for wind-born debris regions shall be designed in accordance with ASCE 7-2010 and installed to resist the wind pressures on the equipment and the supports.
- E. The condensing unit will be factory charged with R-410A.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Unit shall be stored and handled according to the manufacturer's recommendations.

1.6 WARRANTY

- A. Daikin AC (Americas), Inc. (“Daikin AC”) warrants to the customer who is the original owner and user of the Daikin AC products specified above (“Customer”) that under normal use and maintenance for comfort cooling and conditioning applications such products (the “Products”) will be free from defects in material or workmanship. This warranty applies to parts and compressors is limited in duration to ten (10) years from the earlier to occur of (a) the date of original installation, whether or not actual use begins on that date, or (b) eighteen (18) months from the date of shipment by Daikin AC. Customer must present proof of the original date of receipt and of installation of the Product in order to establish the effective date of this warranty. Otherwise the effective date will be deemed to be the date of manufacture plus sixty (60) days. Repaired or replacement parts are warranted for the balance of the warranty period applicable to the original part following the date on which the repaired or replacement part is provided to the Customer.
- B. For Labor: Five years from date of Submittal.

2.0 PRODUCTS

2.1 SYSTEM FEATURES

- A. Voltage Platform – Heat recovery condensing units shall be available with a 460V/3/60 power supply.
- B. Advanced Zoning – A single system shall provide for up to 58 zones.
- C. Auto-charging – Each system shall have a refrigerant auto-charging function.
- D. Defrost Heating – Each system shall maintain continuous heating during defrost operation. Reverse cycle (cooling mode) defrost operation shall not be permitted due to the potential reduction in space temperature.
- E. Oil Return Heating – Each system shall maintain continuous heating during oil return operation. Reverse cycle (cooling mode) oil return during heating operation shall not be permitted due to the potential reduction in space temperature.
- F. Low Ambient Cooling – Each system shall be capable of low ambient cooling operation to -4°F DB.
- G. Independent Control – Each indoor unit shall use a dedicated electronic expansion valve for independent control.
- H. VFD Inverter Control – Each condensing unit shall use a high efficiency, variable speed “inverter” compressor coupled with inverter fan motors for superior part load performance. Compressor capacity shall be modulated automatically to maintain constant suction and condensing pressures while varying the refrigerant volume for the needs of the cooling or heating loads.
- I. Indoor units shall use PID to control superheat to deliver a comfortable room temperature condition and optimize efficiency.

- J. Flexible Design –
1. Systems shall be capable of up to 540ft (640ft equivalent) of linear piping between the condensing unit and furthest located indoor unit.
 2. Systems shall be capable of up to 3,280ft total “one-way” piping in the piping network.
 3. Systems shall have a vertical (height) separation of up to 295ft between the condensing unit and the indoor units.
 4. Systems shall be capable of up to 295ft from the first REFNET™ / branch point.
 5. The condensing unit shall have the ability to connect an indoor unit evaporator capacity of up to 200% of the condensing unit capacity.
 6. Systems shall be capable of 49ft between indoor units.
 7. Condensing units shall be supported with a fan motor ESP up to 0.32” WG as standard to allow connection of discharge ductwork and to prevent discharge air short circuiting.
- K. Simple Wiring – Systems shall use 16/18 AWG, 2 wire, multi-stranded, non-shielded and non-polarized daisy chain control wiring.
- L. Energy Efficiency – System shall have equivalent or better performance than high efficiency air cooled systems.
- M. Outside Air – Systems shall provide outside air capability.
- N. Space Saving – Each system shall have a condensing unit module footprint as small as 3’ 5/8” x 2’ 6/18” (7.66sq ft).
- O. Advanced Diagnostics – Systems shall include a self-diagnostic, auto-check function to detect a malfunction and display the type and location.
- P. Each condensing unit shall incorporate contacts for electrical demand shedding.
- Q. Advanced Controls – Each system shall have at least one remote controller capable of controlling up to 16 indoor units.
- R. Each system shall be capable of integrating with open protocol BACnet and LonWorks building management systems.
- S. Low Sound Levels – Each system shall use indoor and condensing units with quiet operation as low as 27 dB(A).

2.2 CONDENSING UNIT

- A. General: The condensing unit is designed specifically for use with VRV IV series components.
1. The condensing unit shall be factory assembled and pre-wired with all necessary electronic and refrigerant controls. The refrigeration circuit of the condensing unit shall consist of Daikin scroll compressors, motors, fans, condenser coil, electronic expansion valves, solenoid valves, 4-way valve, distribution headers, capillaries, filters, shut off valves, oil separators, service ports and refrigerant regulator.
 2. High/low pressure gas line, liquid and suction lines must be individually insulated between the condensing and indoor units.
 3. The condensing unit can be wired and piped with access from the left, right, rear or bottom.
 4. The connection ratio of indoor units to condensing unit shall be permitted up to 200%.
 5. Each condensing system shall be able to support the connection of up to 56 indoor units dependent on the model of the condensing unit.
 6. The sound pressure level standard shall be that value as listed in the Daikin engineering manual for the specified models at 3 feet from the front of the unit. The condensing unit shall be capable of operating automatically at further reduced noise during night time.
 7. The system will automatically restart operation after a power failure and will not cause any settings to be lost, thus eliminating the need for reprogramming.
 8. The unit shall incorporate an auto-charging feature.
 9. The condensing unit shall be modular in design and should allow for side-by-side installation with minimum spacing.
 10. The following safety devices shall be included on the condensing unit; high pressure sensor and switch, low pressure sensor, control circuit fuses, crankcase heaters, fusible plug, overload relay, inverter overload protector, thermal protectors for compressor and fan motors, over current protection for the inverter and anti-recycling timers.
 11. To ensure the liquid refrigerant does not flash when supplying to the various indoor units, the circuit shall be provided with a sub-cooling feature.
 12. Oil recovery cycle shall be automatic occurring 2 hours after start of operation and then every 8 hours of operation. Each system shall maintain continuous heating during oil return operation. Reverse cycle (cooling mode)

oil return during heating operation shall not be permitted due to the potential reduction in space temperature.

13. The condensing unit shall be capable of heating operation at 0°F dry bulb ambient temperature without additional low ambient controls or an auxiliary heat source.
14. The system shall continue to provide heat to the indoor units in heating operation while in the defrost mode. Reverse cycle (cooling mode) defrost during heating operation shall not be permitted due to the potential reduction in space temperature.

B. Unit Cabinet:

1. The condensing unit shall be completely weatherproof and corrosion resistant. The unit shall be constructed from rust-proofed mild steel panels coated with a baked enamel finish.

C. Fan:

1. The condensing unit shall consist of one or more propeller type, direct-drive 350 or 750 W fan motors that have multiple speed operation via a DC (digitally commutating) inverter.
2. The condensing unit fan motor shall have multiple speed operation of the DC (digitally commutating) inverter type, and be of high external static pressure and shall be factory set as standard at 0.12 in. WG. A field setting switch to a maximum 0.32 in. WG pressure is available to accommodate field applied duct for indoor mounting of condensing units.
3. The fan shall be a vertical discharge configuration with a nominal airflow maximum range of 6,700 CFM to 20,650 CFM dependent on model specified.
4. Nominal sound pressure levels shall be as shown below.
5. The fan motor shall have inherent protection and permanently lubricated bearings and be mounted.
6. The fan motor shall be provided with a fan guard to prevent contact with moving parts.
7. Night setback control of the fan motor for low noise operation by way of automatically limiting the maximum speed shall be a standard feature. Operation sound level shall be selectable from 3 steps as shown below.

D. Condenser Coil:

1. The condenser coil shall be manufactured from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The heat exchanger coil shall be of a waffle louver fin and rifled bore tube design to ensure high efficiency performance.
3. The heat exchanger on the condensing units shall be manufactured from Hi-X seamless copper tube with N-shape internal grooves mechanically bonded on to aluminum fins to an e-Pass Design.
4. The fins are to be covered with an anti-corrosion acrylic resin and hydrophilic film type E1.
5. The pipe plates shall be treated with powdered polyester resin for corrosion prevention. The thickness of the coating must be between 2.0 to 3.0 microns.

E. Compressor:

1. The Daikin inverter scroll compressors shall be variable speed (PVM inverter) controlled which is capable of changing the speed to follow the variations in total cooling and heating load as determined by the suction gas pressure as measured in the condensing unit. In addition, samplings of evaporator and condenser temperatures shall be made so that the high/low pressures detected are read every 20 seconds and calculated. With each reading, the compressor capacity (INV frequency or STD ON/OFF) shall be controlled to eliminate deviation from target value.
2. The inverter driven compressor in each condensing unit shall be of highly efficient reluctance DC (digitally commutating), hermetically sealed scroll “G2-type” with a maximum speed of 7,980 rpm.
3. Neodymium magnets shall be adopted in the rotor construction to yield a higher torque and efficiency in the compressor instead of the normal ferrite magnet type. At complete stop of the compressor, the neodymium magnets will position the rotor into the optimum position for a low torque start.
4. The capacity control range shall be as low as 4% to 100%.
5. Each non-inverter compressor shall also be of the hermetically sealed scroll type.
6. Each compressor shall be equipped with a crankcase heater, high pressure safety switch, and internal thermal overload protector.
7. Oil separators shall be standard with the equipment together with an intelligent oil management system.
8. The compressor shall be spring mounted to avoid the transmission of vibration.

9. Units sized 6-12 tons shall contain a minimum of 2 compressors. 14 ton units shall contain a minimum of 3 compressors. 16-20 ton units shall contain a minimum of 4 compressors. 22-24 ton units shall contain a minimum of 5 compressors. 26-28 ton units shall contain a minimum of 6 compressors. In the event of compressor failure the remaining compressors shall continue to operate and provide heating or cooling as required at a proportionally reduced capacity. The microprocessor and associated controls shall be designed to specifically address this condition.
10. In the case of multiple condenser modules, conjoined operation hours of the compressors shall be balanced by means of the Duty Cycling Function, ensuring sequential starting of each module at each start/stop cycle, completion of oil return, completion of defrost or every 8 hours.

F. Electrical:

1. The power supply to the condensing unit shall be 460 volts, 3 phase, 60 hertz +/- 10%.

2.3 BSV(4/6)Q_P BRANCH SELECTOR

A. General: The BSVQ36PVJU, BSVQ60PVJU, BSVQ96PVJU, BSV4Q36PVJU and BSV6Q36PVJU branch selector boxes are designed specifically for use with VRVIII series heat recovery system components.

1. These selector boxes shall be factory assembled, wired, and piped.
2. These BSVQ_P / BSV4Q_P / BSV6Q_P branch controllers must be run tested at the factory.
3. These selector boxes must be mounted indoors.
4. When simultaneously heating and cooling, the units in heating mode shall energize their sub-cooling electronic expansion valve.

B. Unit Cabinet:

1. These units shall have a galvanized steel plate casing.
2. Each cabinet shall house 5 electronic expansion valves for refrigerant control per branch.
3. The cabinet shall contain one sub-cooling heat exchanger per branch.
4. The unit shall have sound absorption thermal insulation material made of flame and heat resistant foamed polyethylene.

C. Refrigerant Valves:

1. The unit shall be furnished with 5 electronic expansion valves per branch to control the direction of refrigerant flow. The use of solenoid valves for changeover and pressure equalization shall not be acceptable due to refrigerant noise.
2. The refrigerant connections must be of the braze type.
3. Each circuit shall have at least one branch selector box.
4. Multiple indoor units may be connected to a branch selector box with the use of a REFNET™ joint provided they are within the capacity range of the branch selector.

D. Condensate Removal:

1. The unit shall not require provisions for condensate removal.

E. Electrical:

1. The unit electrical power shall be 208/230 volts, 1 phase, 60 hertz.
2. The unit shall be capable of operation within the limits of 187 volts to 253 volts.
3. The minimum circuit amps (MCA) shall be 0.1 and the maximum overcurrent protection amps (MOP) shall be 15.

2.4 REFRIGERANT PIPING

- A. The system shall be capable of refrigerant piping up to 540 actual feet or 620 equivalent feet from the condensing unit to the furthest indoor unit, a total combined liquid line length of 3,280 feet of piping between the condensing and indoor units with 295 feet maximum vertical difference, without any oil traps. REFNET™ piping joints and headers shall be used to ensure proper refrigerant balance and flow for optimum system capacity and performance. T style joints shall not be acceptable as this will negatively impact proper refrigerant balance and flow for optimum system capacity and performance.

3.0 EXECUTION

3.1 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. Factory-authorized representative shall witness and record installation and shall assist in submission of performance testing for Commissioning.

- B. Complete installation and startup checks according to manufacturer's written instructions and do the following:
1. Inspect for visible damage to unit casing.
 2. Inspect for visible damage to compressor, coils, and fans.
 3. Inspect internal insulation.
 4. Verify that labels are clearly visible.
 5. Verify that clearances have been provided for servicing.
 6. Verify that controls are connected and operable.
 7. Verify that filters are installed.
 8. Clean condenser coil and inspect for construction debris.
 9. Connect and purge gas line.
 10. Remove packing from vibration isolators.
 11. Adjust fan belts to proper alignment and tension.
 12. Start unit according to manufacturer's written instructions.
 - a. Start refrigeration system.
 - b. Do not operate below recommended low-ambient temperature.
 - c. Complete startup sheets and attach copy with Contractor's startup report.
 13. Inspect and record performance of interlocks and protective devices; verify sequences.
 14. Operate unit for an initial period as recommended or required by manufacturer.
 15. Calibrate thermostats/sensors.
 16. Inspect outdoor-air dampers for proper stroke and interlock with return-air dampers.
 17. Start refrigeration system and measure and record the following when ambient is a minimum of **15 F** above return-air temperature:
 - a. Coil leaving-air, dry- and wet-bulb temperatures.
 - b. Coil entering-air, dry- and wet-bulb temperatures.
 - c. Outdoor-air, dry-bulb temperature.
 - d. Outdoor-air-coil, discharge-air, dry-bulb temperature.

18. Inspect controls for correct sequencing of heating, outside air interlocks, dampers, and refrigeration, and normal and emergency shutdown.
 19. After startup and performance testing and prior to Substantial Completion, replace existing filters with new filters.
- C. Tests and Inspections:
1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Prepare test and inspection reports.

3.2 INSTALLATION REQUIREMENTS

- A. The system must be installed by a Daikin factory trained contractor/dealer. The bidders shall be required to submit training certification proof with bid documents. The mechanical contractor's installation price shall be based on the systems installation requirements. The mechanical contractor bids with complete knowledge of the HVAC system requirements. Untrained contractors who wish to bid this project may contact manufacturer's rep to arrange training prior to bid day.
- B. Install unit(s) level and plumb.
- C. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.
- D. Install and connect pre-charged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.3 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.
- C. Duct Connections: Duct installation requirements are specified in Division 23 Section "Metal Ducts". Drawings indicate the general arrangement of ducts. Duct connections shall be made with flexible duct connectors. Flexible duct connectors are specified in Division 23 Section "Air Duct Accessories."

3.4 CLEANING AND ADJUSTING

- A. After completing system installation and testing, adjusting, and balancing RTU and air-distribution systems, clean filter housings and install new filters.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain VRS. Refer to Division 01 Section "Demonstration and Training."
- B. Remove and replace malfunctioning units and retest as specified above.
- C. Prepare test and inspection reports.

END OF SECTION

SECTION 23 81 28 – VRV FAN COILS

1.0 GENERAL

1.1 SUMMARY

- A. Section Includes the indoor fan coils associated with a variable capacity, heat recovery air conditioning system (VRV HEAT RECOVERY/HEAT PUMP).

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. For refrigerants, documentation including printed statement that refrigerants are free of HCFCs.
 - 2. Documentation indicating that units comply with ASHRAE 62.1-2004, Section 5 - "Systems and Equipment."
 - 3. Operation and maintenance data,
 - 4. Warranty

1.3 QUALITY ASSURANCE

- A. The units shall be tested by a Nationally Recognized Testing Laboratory (NRTL), in accordance with ANSI/UL 1995/CAN/CSA-C22.2 No. 236-05 (R2009) – Heating and Cooling Equipment and bear the Listed Mark.
- B. All wiring shall be in accordance with the National Electric Code (NEC)/Canadian Electrical Code (CEC).
- C. The system will be produced in an ISO 9001 and ISO 14001 facility, which are standards set by the International Standard Organization (ISO). The system shall be factory tested for safety and function.
- D. The outdoor unit will be factory charged with R-410A.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Unit shall be stored and handled according to the manufacturer's recommendations.

1.5 WARRANTY

- A. Daikin AC (Americas), Inc. ("Daikin AC") warrants to the customer who is the original owner and user of the Daikin AC products specified above ("Customer") that under normal use and maintenance for comfort cooling and conditioning applications such products (the "Products") will be free from defects in material or workmanship. This warranty applies to parts and is limited in duration to ten (10) years from the earlier to occur of (a) the date of original installation, whether or not actual use begins

on that date, or (b) eighteen (18) months from the date of shipment by Daikin AC. Customer must present proof of the original date of receipt and of installation of the Product in order to establish the effective date of this warranty. Otherwise the effective date will be deemed to be the date of manufacture plus sixty (60) days. Repaired or replacement parts are warranted for the balance of the warranty period applicable to the original part following the date on which the repaired or replacement part is provided to the Customer.

- B. For Labor: Five years from date of Submittal.

2.0 PRODUCTS

2.1 FXFQ_T – ROUND FLOW SENSING CEILING CASSETTE UNIT

- A. General: Daikin indoor unit model FXFQ_T shall be a round flow ceiling cassette fan coil unit, operable with R-410A refrigerant, equipped with an electronic expansion valve, direct drive DC (ECM) type fan, for installation into the ceiling cavity equipped with an air panel grill. It shall be available in capacities from 7,500 Btu/h to 48,000 Btu/h. Model numbers are FXFQ07TVJU, FXFQ09TVJU, FXFQ12TVJU, FXFQ15TVJU, FXFQ18TVJU, FXFQ24TVJU, FXFQ30TVJU, FXFQ36TVJU, FXFQ48TVJU to be connected to outdoor unit model RXYQ / RXYMQ / RWEYQ heat pump and REYQ / RWEYQ heat recovery model. It shall be a round flow air distribution type, fresh white, impact resistant decoration panel, or optional self-cleaning filter panel. The supply air is distributed via four individually motorized louvers. To save energy and optimize occupancy comfort, the indoor unit shall be equipped with built in occupancy sensor and surface temperature sensor. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote control BRC1E72, BRC2A71 and BRC1E52B7. The indoor units sound pressure shall range from 30 dB(A) to 45 dB(A) at High speed measured at 5 feet below the unit.
- B. Indoor Unit:
1. The Daikin indoor unit FXFQ_T shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, condensate drain pump, condensate safety shutoff and alarm, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch.
 2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
 3. Both refrigerant lines shall be insulated from the outdoor unit.

4. The round flow supply air flow can be field modified to 23 different airflow patterns to accommodate various installation configurations including corner installations.
5. Return air shall be through the concentric panel, which includes a resin net, mold resistant, antibacterial filter.
6. The indoor units shall be equipped with a condensate pan with antibacterial treatment and condensate pump. The condensate pump provides up to 33-1/2" of lift from bottom of unit to top of drain piping and has a built-in safety shutoff and alarm.
7. The indoor units shall be equipped with a return air thermistor.
8. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
9. The voltage range will be 253 volts maximum and 187 volts minimum.
10. To save energy and optimize occupancy comfort, the indoor unit shall be equipped with built in occupancy sensor and surface temperature sensor.
11. Supplied air shall be directed automatically by four individually controlled louvers.

C. Unit Cabinet:

1. The cabinet shall be space saving and shall be located into the ceiling.
2. Four auto-adjusted louvers shall be available to choose, which include standard, draft prevention and ceiling stain prevention.
3. The airflow of the unit shall have the ability to shut down outlets with multiple patterns allowing for simpler installation in irregular spaces.
4. Fresh air intake shall be possible by way of Daikin's optional fresh air intake kit.
5. A branch duct knockout shall exist for branch ducting of supply air.
6. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.
7. Optional high efficiency air filters are available for each model unit.

D. Fan:

1. The fan shall be direct-drive DC (ECM) type fan, statically and dynamically balanced impeller with three fan speeds available.
2. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range from 0.08 to 0.16 HP.

3. The airflow rate shall be available in three manual settings.
4. The DC fan shall be able to automatically adjust the fan speed in 5 speeds based on the space load.
5. The fan motor shall be equipped as standard with adjustable external static pressure (ESP) settings to allow operation with the high efficiency air filter options.
6. The fan motor shall be thermally protected.

E. Filter:

1. The return air shall be filtered by means of a washable long-life filter with mildew proof resin and antibacterial treatment.
2. Optional high efficiency disposable air filters shall be available.
3. Optional Self-Cleaning Filter Panel, which performs automatic filter cleaning up to once a day, with dust collection box that indicates when to be emptied.

F. Coil:

1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
3. The coil shall be a 2, or 3-row cross fin copper evaporator coil with up to 21 FPI design completely factory tested.
4. The refrigerant connections shall be flare connections and the condensate will be 1 -1/4 inch outside diameter PVC.
5. A condensate pan with antibacterial treatment shall be located under the coil.
6. A thermistor will be located on the liquid and gas line.

G. Electrical:

1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.
2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).
3. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

H. Control:

1. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.
2. The unit shall be compatible with interfacing with a BMS system via optional BACnet gateways.
3. The unit shall be compatible with a Daikin Intelligent Touch Manager advanced multi-zone controller.
4. For the Sensing functions and the optional Self-Cleaning Filter functions, Remote controller BRC1E52B7 shall be used. Consult with Daikin prior to applying controls.

I. Optional Accessories Available:

1. A high efficiency disposable air filter kit.
2. Air intake kit .
3. Self-Cleaning Filter Panel, which performs automatic filter cleaning up to once a day, with dust collection box that indicates when to be emptied.
4. Remote “in-room” sensor kit (KRCS01-4B).
 - a. The Daikin wall mounted, hard wired remote sensor kit is recommended for when a NAV controller is not used or when the NAV controller is not located in the space that is being controlled. The sensor for detecting the temperature can be placed away from the indoor unit (branch wiring is included in the kit).

2.2 FXZQ – 4 WAY CEILING CASSETTE UNIT (2’x2’)

A. General: Daikin indoor unit model FXZQ shall be a ceiling cassette fan coil unit, operable with R-410A refrigerant, equipped with an electronic expansion valve, for installation into the ceiling cavity equipped with an air panel grill. It shall be available in capacities from 7,500 Btu/h to 18,000 Btu/h to be connected to outdoor unit model RXYQ / RXTQ heat pump and/or REYQ heat recovery model. It shall be a four-way air distribution type, white (RAL9010), impact resistant with a washable decoration panel. The supply air is distributed via motorized louvers which can be horizontally and vertically adjusted from 0° to 90°. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote control BRC1E72 and BRC2A71. The indoor units sound pressure shall range from 29 dB(A) to 34 dB(A) at low speed measured at 5 feet below the unit.

B. Indoor Unit:

1. The Daikin indoor unit FXZQ shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, condensate drain pump, condensate safety shutoff and alarm, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch.
2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
3. Both refrigerant lines shall be insulated from the outdoor unit.
4. The 4-way supply air flow can be field modified to 3-way and 2-way airflow to accommodate various installation configurations including corner installations.
5. Return air shall be through the concentric panel, which includes a resin net mold resistant filter.
6. The indoor units shall be equipped with a condensate pan and condensate pump. The condensate pump provides up to 21” of lift and has a built in safety shutoff and alarm.
7. The indoor units shall be equipped with a return air thermistor.
8. All electrical components are reached through the decoration panel, which reduces the required side service access.
9. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
10. The voltage range will be 253 volts maximum and 187 volts minimum.

C. Unit Cabinet:

1. The cabinet shall be space saving and shall be located into the ceiling.
2. Three auto-swing positions shall be available to choose, which include standard, draft prevention and ceiling stain prevention.
3. The airflow of the unit shall have the ability to shut down one or two sides allowing for simpler corner installation.
4. Fresh air intake shall be possible by way of direct duct installation to the side of the indoor unit cabinet.
5. A branch duct knockout shall exist for branch ducting supply air.
6. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

D. Fan:

1. The fan shall be direct-drive turbo fan type with statically and dynamically balanced impeller with high and low fan speeds available.
 2. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range from 0.06 to 0.12 HP.
 3. The airflow rate shall be available in high and low settings.
 4. The fan motor shall be thermally protected.
- E. Filter:
1. The return air shall be filtered by means of a washable long-life filter with mildew proof resin.
- F. Coil:
1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
 2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
 3. The coil shall be a 2-row cross fin copper evaporator coil with 17 FPI design completely factory tested.
 4. The refrigerant connections shall be flare connections and the condensate will be 1 -1/32 inch outside diameter PVC.
 5. A condensate pan shall be located under the coil.
 6. A condensate pump with a 21 inch lift shall be located below the coil in the condensate pan with a built in safety alarm.
 7. A thermistor will be located on the liquid and gas line.
- G. Electrical:
1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.
 2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).
 3. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.
- H. Control:

1. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.
2. The unit shall be compatible with interfacing with a BMS system via optional BACnet gateways.
3. The unit shall be compatible with a Daikin Intelligent Touch Manager advanced multi-zone controller.

I. Optional Accessories Available:

1. Direct fresh air intake kit (KDDQ44X60).
2. Supply air duct connections.
3. Remote “in-room” sensor kit (KRCS01-1B).
 - a. The Daikin wall mounted, hard wired remote sensor kit is recommended for ceiling-embedded type fan coils, which often result in a difference between set temperature and actual temperature. The sensor for detecting the temperature can be placed away from the indoor unit (branch wiring is included in the kit).

2.3 FXMQ_M – CONCEALED CEILING DUCTED UNIT (Med. Static)

- A. General: Daikin indoor unit FXMQ_M shall be a built-in ceiling concealed fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, for installation into the ceiling cavity. It is constructed of a galvanized steel casing. It shall be available in capacities from 72,000 Btu/h to 96,000 Btu/h be connected to outdoor unit model RXYQ / RXTQ heat pump and/or REYQ heat recovery model. It shall be a horizontal discharge air with horizontal return air configuration. All models feature a low height cabinet making them applicable to ceiling pockets that tend to be shallow. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote control BRC1E72 and BRC2A71. The indoor units sound pressure shall be 48 dB(A) at low speed measured 5 feet below the ducted unit.
- B. Performance: Each unit’s performance is based on nominal operating conditions:
- C. Indoor Unit:
 1. The Daikin indoor unit FXMQ_M shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The unit shall have an adjustable external static pressure switch.

2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
3. Both refrigerant lines shall be insulated from the outdoor unit.
4. The indoor units shall be equipped with a return air thermistor.
5. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
6. The voltage range will be 253 volts maximum and 187 volts minimum.

D. Unit Cabinet:

1. The cabinet shall be located into the ceiling and ducted to the supply and return openings.
2. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

E. Fan:

1. The fan shall be direct-drive Sirocco type fan, statically and dynamically balanced impeller with high and low fan speeds available.
2. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz, with a motor output of 0.51 HP.
3. The airflow rate shall be available in high and low settings.
4. The fan motor shall be thermally protected.
5. The fan motor shall be equipped as standard with adjustable external static pressure (ESP) settings.
6. Fan motor external static pressure for nominal airflow:

F. Coil:

1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
3. The coil shall be a 3-row cross fin copper evaporator coil with 13 fpi design completely factory tested.
4. The refrigerant connections shall be flare connections and the condensate will be 1-5/16 inch outside diameter PVC.

5. A thermistor will be located on the liquid and gas line.

G. Electrical:

1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.
2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).
3. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

H. Control:

1. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.
2. The unit shall be compatible with interfacing with a BMS system via optional BACnet gateways.
3. The unit shall be compatible with a Daikin Intelligent Touch Manager advanced multi-zone controller.

I. Optional Accessories Available:

1. Remote “in-room” sensor kit KRCS01-1B (recommended).
 - a. The Daikin wall mounted, hard wired remote sensor kit is recommended for ceiling-embedded type fan coils, which often result in a difference between set temperature and actual temperature. The sensor for detecting the temperature can be placed away from the indoor unit (branch wiring is included in the kit).

2.4 FXMQ_PA - CONCEALED CEILING DUCTED UNIT (Med. Static)

- A. General: Daikin indoor unit FXMQ_PA shall be a built-in ceiling concealed fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, direct-drive DC (ECM) type fan with auto CFM adjustment at commissioning, for installation into the ceiling cavity. It is constructed of a galvanized steel casing. It shall be available in capacities from 7,500 Btu/h to 48,000 Btu/h RXYQ / RXTQ heat pump and REYQ heat recovery model. It shall be a horizontal discharge air with horizontal return air configuration. All models feature a low height cabinet making them applicable to ceiling pockets that tend to be shallow. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The unit shall be equipped with a programmed drying mechanism that dehumidifies while limiting changes in room temperature when used with Daikin remote control BRC1E72 and BRC2A71. Included as standard equipment, a condensate drain pan and drain pump kit that pumps to 18-3/8” from the drain pipe

opening. The indoor units sound pressure shall range from 29 dB(A) to 43 dB(A) at low speed measured 5 feet below the ducted unit.

B. Indoor Unit:

1. The Daikin indoor unit FXMQ_PA shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, condensate drain pan, condensate drain pump, condensate safety shutoff and alarm, self-diagnostics, auto-restart function, 3-minute fused time delay, and test run switch. The unit shall be equipped with automatically adjusting external static pressure logic that is selectable during commissioning. This adjusts the airflow based on the installed external static pressure.
2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
3. Both refrigerant lines shall be insulated from the outdoor unit.
4. The indoor units shall be equipped with a condensate pan and condensate pump. The condensate pump provides up to 18-3/8" of lift from the center of the drain outlet and has a built in safety shutoff and alarm.
5. The indoor units shall be equipped with a return air thermistor.
6. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
7. The voltage range will be 253 volts maximum and 187 volts minimum.

C. Unit Cabinet:

1. The cabinet shall be located into the ceiling and ducted to the supply and return openings.
2. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

D. Fan:

1. The fan shall be direct-drive DC (ECM) type fan, statically and dynamically balanced impeller with three fan speeds available.
2. The unit shall be equipped with automatically adjusting external static pressure logic selectable during commissioning.
3. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz with a motor output range of 0.12 to 0.47 HP respectively.
4. The airflow rate shall be available in three settings.

5. The fan motor shall be thermally protected.
6. The fan motor shall be equipped as standard with adjustable external static pressure (ESP) settings.

E. Coil:

1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
3. The coil shall be a 3-row cross fin copper evaporator coil with 13 fpi design completely factory tested.
4. The refrigerant connections shall be flare connections and the condensate will be 1-1/4" outside diameter PVC.
5. A condensate pan shall be located under the coil.
6. A condensate pump with an 18-3/8" lift shall be located below the coil in the condensate pan with a built-in safety alarm.
7. A thermistor will be located on the liquid and gas line.

F. Electrical:

1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.
2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).
3. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

G. Control:

1. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.
2. The unit shall be compatible with interfacing with a BMS system via optional BACnet gateways.
3. The unit shall be compatible with a Daikin Intelligent Touch Manager advanced multi-zone controller.

H. Optional Accessories Available:

1. Remote “in-room” sensor kit KRCS01-4B (recommended).
 - a. The Daikin wall mounted, hard wired remote sensor kit is recommended for when a NAV controller is not used or when the NAV controller is not located in the space that is being controlled. The sensor for detecting the temperature can be placed away from the indoor unit (branch wiring is included in the kit).
2. MERV 13 Filter kit. Can be configured for right or left access. Filters replaceable without tools.
3. Air side Economizer designed for connection to the rear of FXMQ30-54PAVJU.

2.5 FXMQ_MF – OUTSIDE AIR PROCESSING UNIT

A. General: Daikin indoor unit FXMQ_MF shall be a built-in ceiling concealed fan coil unit, operable with refrigerant R-410A, equipped with an electronic expansion valve, for installation into the ceiling cavity. The unit shall be capable of introducing up to 100% outside air controlled to a fixed discharge air temperature. It is constructed of a galvanized steel casing. It shall be available in capacities from 48,000 Btu/h to 96,000 Btu/h. Model numbers are FXMQ48MFVJU, FXMQ72MFVJU and FXMQ96MVJU to be connected to outdoor unit model RXYQ / RXYMQ / RWEYQ heat pump and REYQ / RWEYQ heat recovery model. It shall be a horizontal discharge air with horizontal return air configuration. All models feature a low height cabinet making them applicable to ceiling pockets that tend to be shallow. Computerized PID control shall be used to control superheat to deliver a comfortable room temperature condition. The indoor units sound pressure shall range from 42 dB(A) to 47 dB(A) at low speed measured 5 feet below the ducted unit.

B. Indoor Unit:

1. The Daikin indoor unit FXMQ_MF shall be completely factory assembled and tested. Included in the unit is factory wiring, piping, electronic proportional expansion valve, control circuit board, fan motor thermal protector, flare connections, self-diagnostics, auto-restart function, 3-minute fused time delay and test run switch.
2. Indoor unit and refrigerant pipes will be charged with dehydrated air prior to shipment from the factory.
3. Both refrigerant lines shall be insulated from the outdoor unit.
4. The indoor units shall be equipped with a discharge air thermistor.
5. The indoor unit will be separately powered with 208~230V/1-phase/60Hz.
6. The voltage range will be 253 volts maximum and 187 volts minimum.

C. Unit Cabinet:

1. The cabinet shall be located into the ceiling and ducted to the supply and return openings.
2. The cabinet shall be constructed with sound absorbing foamed polystyrene and polyethylene insulation.

D. Fan:

1. The fan shall be direct-drive Sirocco type fan, statically and dynamically balanced impeller with high and low fan speeds available.
2. The fan motor shall operate on 208/230 volts, 1 phase, 60 hertz, with a motor output of 0.51 HP.
3. The fan motor shall be thermally protected.

E. Coil:

1. Coils shall be of the direct expansion type constructed from copper tubes expanded into aluminum fins to form a mechanical bond.
2. The coil shall be of a waffle louver fin and high heat exchange, rifled bore tube design to ensure highly efficient performance.
3. The coil shall be a 3-row cross fin copper evaporator coil with 13 fpi design completely factory tested.
4. The refrigerant connections shall be flare connections and the condensate will be 1-5/16 inch outside diameter PVC.
5. A thermistor will be located on the liquid and gas line.

F. Electrical:

1. A separate power supply will be required of 208/230 volts, 1 phase, 60 hertz. The acceptable voltage range shall be 187 to 253 volts.
2. Transmission (control) wiring between the indoor and outdoor unit shall be a maximum of 3,280 feet (total 6,560 feet).
3. Transmission (control) wiring between the indoor unit and remote controller shall be a maximum distance of 1,640 feet.

G. Control:

1. The unit shall have controls provided by Daikin to perform input functions necessary to operate the system.
2. The unit shall be compatible with interfacing with a BMS system via optional BACnet gateways.

3. The unit shall be compatible with a Daikin Intelligent Touch Manager advanced multi-zone controller.

3.0 EXECUTION

3.1 INSTALLATION REQUIREMENTS

- A. The system must be installed by a Daikin factory trained contractor/dealer. The bidders shall be required to submit training certification proof with bid documents. The mechanical contractor's installation price shall be based on the systems installation requirements. The mechanical contractor bids with complete knowledge of the HVAC system requirements. Untrained contractors who wish to bid this project may contact manufacturer's rep to arrange training prior to bid day.
- B. Install units' level and plumb.
- C. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.
- D. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.
- C. Duct Connections: Duct installation requirements are specified in Division 23 Section "Metal Ducts". Drawings indicate the general arrangement of ducts. Duct connections shall be made with flexible duct connectors. Flexible duct connectors are specified in Division 23 Section "Air Duct Accessories."

3.3 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. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

Project: 855 East Laurel Drive Emergency Shelter
Project No. 8875
Bid No. 10736

3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Remove and replace malfunctioning units and retest as specified above.
 - D. Prepare test and inspection reports.

END OF SECTION

**Division 26:
Electrical**

SECTION 260500 – GENERAL ELECTRICAL REQUIREMENTS

PART 1 – GENERAL

1.1 Description of Work:

- A. The work of this Section consists of providing all required labor, supervision, materials and equipment to satisfactorily complete all electrical installations that are shown on the Drawings, included in these specifications, or otherwise needed for a complete and fully operating facility.
- B. Furnish and install all required in-place equipment, conduits, conductors, cables and any miscellaneous materials for the satisfactory interconnection and operation of all associated electrical systems.

1.2 Related Work:

- A. This Section provides the basic Electrical Requirements which supplement the General Requirements of Division 01 and apply to all Sections of Division 26.

1.3 Submittals:

- A. As specified in Division 01. Submit to the Architect shop drawings, manufacturer's data and certificates for equipment, materials and finish, and pertinent details for each system specified. Information to be submitted includes manufacturer's descriptive literature of cataloged products, equipment, drawings, diagrams, performance and characteristic curves as applicable, test data and catalog cuts. Obtain written approval before procurement, fabrication, or delivery of the items to the job site. Partial submittals are not acceptable and will be returned without review. Furnish manufacturer's name, trade name, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and paragraph reference, applicable Federal, Industry and Technical Society Publication References, and years of satisfactory service of each item required to establish contract compliance. Photographs of existing installations and data submitted in lieu of catalog data are not acceptable and will be returned without approval.
- B. Organize submittals for equipment and items related to each specification section together as a package.
- C. Proposed substitutions of products will not be reviewed or approved prior to awarding of the Contract.
- D. Substitutions shall be proven to the Architect or Engineer to be equal or superior to the specified product. Architect's decision is final. The Contractor shall pay all costs incurred by the Architect and Engineer in reviewing and processing any proposed substitutions whether or not a proposed substitution is accepted.

- E. If a proposed substitution is rejected, the contractor shall furnish the specified product at no increase in contract price.
- F. If a proposed substitution is accepted, the contractor shall be completely responsible for all dimensional changes, electrical changes, or changes to other work which are a result of the substitution. The accepted substitution shall be made at no additional cost to the owner or design consultants.

1.4 Quality Assurance:

- A. Codes: All electrical equipment and materials, including installation and testing, shall conform to the latest editions following applicable codes:
 - 1. California Electrical Code (CEC).
 - 2. Occupational Safety and Health Act (OSHA) standards.
 - 3. All applicable local codes, rules and regulations.
 - 4. Electrical Contractor shall possess a C-10 license and all other licenses as may be required. Licenses shall be in effect at start of this contract and be maintained throughout the duration of this contract.
- B. Variances: In instances where two or more codes are at variance, the most restrictive requirement shall apply.
- C. Standards: Equipment shall conform to applicable standards of American National Standards Institute (ANSI), Electronics Industries Association (EIA), Institute of Electrical and Electronics Engineers (IEEE), and National Electrical Manufacturers Association (NEMA).
- D. Underwriter Laboratories (UL) listing is required for all equipment and materials where such listing is offered by the Underwriters Laboratories. Provide service entrance labels for all equipment required by the NEC to have such labels.
- E. The electrical contractor shall guarantee all work and materials installed under this contract for a period of one (1) year from date of acceptance by owner.
- F. All work and materials covered by this specification shall be subject to inspection at any and all times by representatives of the owner. Work shall not be closed in or covered before inspection and approval by the owner or his representative. Any material found not conforming with these specifications shall, within 3 days after being notified by the owner, be removed from premises; if said material has been installed, entire expense of removing and replacing same, including any cutting and patching that may be necessary, shall be borne by the contractor.

1.5 Contract Documents:

A. Drawings and Specifications:

1. In the case of conflict between the drawings and specifications, the specifications shall take precedence.
2. Drawings and specifications are intended to comply with all law, ordinances, rules and regulations of constituted authorities having jurisdiction, and where referred to in the Contract Documents, said laws, ordinance, rules and regulations shall be considered as a part of said Contract Documents within the limits specified. The Contractor shall bear all expenses of correcting work done contrary to said laws, ordinance, rules and regulations if the Contractor knew or should have known that the work as performed is contrary to said laws, ordinances, rules and regulations and if the Contractor performed same (1) without first consulting the Architect for further instructions regarding said work and/or (2) disregarded the Architect's instructions regarding said work.

B. Drawings: The Electrical Drawings shall govern the general layout of the completed construction.

1. Locations of equipment, panels, pullboxes, conduits, stub-ups, ground connections are approximate unless dimensioned; verify locations with the Architect prior to installation.
2. Review the Drawings and Specification Divisions of other trades and perform the electrical work that will be required for those installations.
3. Should there be a need to deviate from the Electrical Drawings and Specifications, submit written details and reasons for all changes to the Architect for approval.
4. The general arrangement and location of existing conduits, piping, apparatus, etc., is approximate. The drawings and specifications are for the assistance and guidance of the contractor, exact locations, distances and elevations are governed by actual field conditions. Accuracy of data given herein and on the drawings is not guaranteed. Minor changes may be necessary to accommodate work. The contractor is responsible for verifying existing conditions. Should it be necessary to deviate from the design due to interference with existing conditions or work in progress, claims for additional compensation shall be limited to those for work required by unforeseen conditions as determined by the Architect.
5. All drawings and divisions of these specifications shall be considered as whole. The contractor shall report any apparent discrepancies to the Architect prior to submitting bids.

6. The contractor shall be held responsible to have examined the site and compared it with the specifications and plans and to have satisfied himself as to the conditions under which the work is to be performed. He shall be held responsible for knowledge of all existing conditions whether or not accurately described. No subsequent allowance shall be made for any extra expense due to failure to make such examination.

1.6 Closeout Submittals:

- A. Manuals: Furnish manuals for equipment where manuals are specified in the equipment specifications or are specified in Division 01.

1.7 Coordination:

- A. Coordinate the electrical work with the other trades, code authorities, utilities and the Architect.
- B. Utility Company charges shall be paid by the Owner.
- C. Contractor shall pay all inspection and other applicable fees and procure all permits necessary for the completion of this work.
- D. Where connections must be made to existing installations, properly schedule all the required work, including the power shutdown periods.
- E. When two trades join together in an area, make certain that no electrical work is omitted.

1.8 Job Conditions:

- A. Operations: Perform all work in compliance with Division 01.
 1. Keep the number and duration of power shutdown periods to a minimum.
 2. Show all proposed shutdowns and their expected duration on the construction schedule. Schedule and carry out shutdowns so as to cause the least disruption to operation of the Owner's facilities.
 3. Carry out shutdown only after the schedule has been approved, in writing, by the owner. Submit power interruption schedule 15 days prior to date of interruption.
- B. Construction Power: Unless otherwise noted in Division 01 of these specifications, contractor shall make all arrangements and provide all necessary facilities for temporary construction power from the owner's on site source. Energy costs shall be paid for by the Owner.

- C. Storage: Provide adequate storage for all equipment and materials which will become part of the completed facility so that it is protected from weather, dust, water, or construction operations.

1.9 Damaged Products:

- A. Notify the Architect in writing in the event that any equipment or material is damaged. Obtain approval from the Architect before making repairs to damaged products.

1.10 Locations:

- A. General: Use equipment, materials and wiring methods suitable for the types of locations in which they are located.
- B. Dry Locations: All those indoor areas which do not fall within the definition below for Wet Locations and which are not otherwise designated on the Drawings.
- C. Wet Locations: All locations exposed to the weather, whether under a roof or not, unless otherwise designated on the Drawings.

1.11 Safety and Indemnity:

- A. The Contractor is solely and completely responsible for conditions of the job site including safety of all persons and property during performance of the work. This requirement will apply continually and not be limited to normal working hours. The contractor shall provide and maintain throughout the work site proper safeguards including, but not limited to, enclosures, barriers, warning signs, lights, etc. to prevent accidental injury to people or damage to property.
- B. No act, service, drawing review or construction review by the Owner, the Engineer or their Consultants is intended to include reviews of the adequacy of the Contractors safety measures in or near the construction site.
- C. The Contractor performing work under this Division of the Specifications shall hold harmless, indemnify, and defend the Owner, the Engineer, their consultants, and each of their officers, agents and employees from any and all liability claims, losses, or damage arising out of or alleged to arise from bodily injury, sickness, or death of a person or persons and for all damages arising out of injury to or destruction of property arising directly or indirectly out of or in connection with the performance of the work under this Division of the Specifications, and from the Contractor's negligence in the performance of the work described in the construction contract documents, but not including liability that may be due to the sole negligence of the Owner, the Engineer, their Consultants or their officers, agents and employees.

- D. If a work area is encountered that contains hazardous materials, the contractor is advised to coordinate with the owner and its abatement consultant for abatement of hazardous material by the Owner's Representative. "Hazardous materials" means any toxic substance regulated or controlled by OSHA, EPA, State of California or local rules, regulations and laws. Nothing herein shall be construed to create a liability for Aurum Consulting Engineers regarding hazardous materials abatement measures, or discovery of hazardous materials.

1.12 Access Doors:

- A. The contractor shall install access panels as required where floors, walls or ceilings must be penetrated for access to electrical, control, fire alarm or other specified electrical devices. The minimum size panel shall be 14" x 14" in usable opening. Where access by a service person is required, minimum usable opening shall be 18" x 24".
- B. All access doors installed lower than 7'-0" above finished floor and exposed to public access shall have keyed locks.
- C. Where specific information or details relating to access panels differ from Division 26 paragraph 1.12 of these specifications, or shown on the electrical drawings and details or under other Divisions of work, those requirements shall supersede these specifications.

1.13 Arc Flash:

- A. The contractor shall install a clearly visible arc flash warning to the inside door of all panelboards and industrial control panels, as well as to the front of all switchboards and motor control centers that are a part of this project.
- B. The warning shall have the following wording: line 1 "WARNING" (in large letters), line 2 "Potential Arc Flash Hazard" (in medium letters), line 3 & 4 "Appropriate Personal Protective Equipment and Tools required when working on this equipment".

PART 2 - PRODUCTS

2.1 Standard of Quality:

- A. Products that are specified by manufacturer, trade name or catalog number establish a standard of quality and do not prohibit the use of equal products of other manufacturers provided they are established to be equal to the specified product and approved by the Architect prior to installation.
- B. Material and Equipment: Provide materials and equipment that are new and are current products of manufacturers regularly engaged in the production of such products. The standard products shall have been in satisfactory commercial or industrial use for two years prior to bid opening. The two-year period includes use of equipment and materials of

similar size under similar circumstances. For uniformity, only one manufacturer will be accepted for each type of product.

- C. Service Support: Submit a certified list of qualified permanent service organizations including their addresses and qualification for support of the equipment. These service organizations shall be convenient to the equipment installation and able to render service to the equipment on a regular and emergency basis during the warranty period of the contract.
- D. Manufacturer's Recommendations: Where installation procedures are required to be in accordance with manufacturer's recommendations, furnish printed copies of the recommendations prior to installation. Installation of the item shall not proceed until recommendations are received. Failure to furnish recommendation shall be cause for rejection of the equipment or material.

2.2 Nameplates:

- A. For each piece of electrical equipment, provide a manufacturer's nameplate showing his name, location, the pertinent ratings, the model designation, and shop order number.
- B. Identify each piece of equipment and related controls with a rigid laminated engraved plastic nameplate. Unless otherwise noted, nameplates shall be melamine plastic 0.125 inch thick, white with black center core. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be 0.5 by 2.5 inches unless otherwise noted. Where not otherwise specified, lettering shall be a minimum of 0.25 inch high normal block style. Engrave nameplates with the inscriptions indicated on the Drawings and, if not so indicated, with the equipment name. Securely fasten nameplates in place using two stainless steel or brass screws.

2.3 Fasteners:

- A. Fasteners for securing equipment to walls, floors and the like shall be either hot-dip galvanized after fabrication or stainless steel.

2.4 Finish requirements:

- A. Equipment: Refer to each electrical equipment section of these Specifications for painting requirements of equipment enclosures. Repair any final paint finish which has been damaged or is otherwise unsatisfactory, to the satisfaction of the Architect.
- B. Wiring System: In finished areas, paint all exposed conduits, boxes and fittings to match the color of the surface to which they are affixed.

PART 3 - EXECUTION

3.1 Workmanship:

- A. Ensure that all equipment and materials fit properly in their installation.
- B. Perform any required work to correct improperly fit installation at no additional expense to the owner.
- C. All electrical equipment and materials shall be installed in a neat and workmanship manner in accordance with the “NECA-1 Standard Practices for Good Workmanship in Electrical Contracting”. Workmanship of the entire job shall be first class in every respect.

3.2 Equipment Installations:

- A. Provide the required inserts, bolts and anchors, and securely attach all equipment and materials to their supports.
- B. Do all the cutting and patching necessary for the proper installation of work and repair any damage done.
- C. Earthquake restraints: all electrical equipment, including conduits over 2 inches in diameter, shall be braced or anchored to resist a horizontal force acting in any direction as per CBC Section 1616A Title 24, part 2 and ASCE7-10, Sections 13.3 and 13.6 and Table 13.6-1.
- D. Structural work: All core drilling, bolt anchor insertion, or cutting of existing structural concrete shall be approved by a California registered structural consulting engineer prior to the execution of any construction. At all floor slabs and structural concrete walls to be drilled, cut or bolt anchors inserted, the contractor shall find and mark all reinforcing in both faces located by means of x-ray, pach-ometer, or prof-ometer. Submit sketch showing location of rebar and proposed cuts, cores, or bolt anchor locations for approval.

3.3 Field Test:

- A. Test shall be in accordance with Acceptance testing specifications issued by the National Electrical Testing Association (NETA).
- B. Perform equipment field tests and adjustments. Properly calibrate, adjust and operationally check all circuits and components, and demonstrate as ready for service. Make additional calibration and adjustments if it is determined later that the initial adjustments are not satisfactory for proper performance. Perform equipment field test for equipment where equipment field tests are specified in the equipment Specifications. Give sufficient notice to the Architect prior to any test so that the tests may be witnessed.
- C. Provide instruments, other equipment and material required for the tests. These shall be of the type designed for the type of tests to be performed. Test instrument shall be calibrated by a recognized testing laboratory within three months prior to performing tests.

- D. Operational Tests: Operationally test all circuits to demonstrate that the circuits and equipment have been properly installed and adjusted and are ready for full-time service. Demonstrate the proper functioning of circuits in all modes of operation, including alarm conditions.
- E. Re-testing will be required for all unsatisfactory tests after the equipment or system has been repaired. Re-test all related equipment and systems if required by the Architect. Repair and re-test equipment and systems which have been satisfactorily tested but later fail, until satisfactory performance is obtained.
- F. Maintain records of each test and submit five copies to the Architect when testing is complete. All tests shall be witnessed by the Architect. These records shall include:
 - 1. Name of equipment tested.
 - 2. Date of report.
 - 3. Date of test.
 - 4. Description of test setup.
 - 5. Identification and rating of test equipment.
 - 6. Test results and data.
 - 7. Name of person performing test.
 - 8. Owner or Architect's initials.
- G. Items requiring testing shall be as noted in the additional electrical sections of these specifications.

3.4 Cleaning Equipment:

- A. Thoroughly clean all soiled surfaces of installed equipment and materials.

3.5 Painting of Equipment:

- A. Factory Applied: Electrical equipment shall have factory applied painting system which shall, as a minimum, meet the requirements of NEMA ICS 6 corrosion-resistance test and the additional requirements specified in the technical section.
- B. Field Applied: Paint electrical equipment as required to match finish of adjacent surfaces.

3.6 Records:

- A. Maintain one copy of the contract Drawing Sheets on the site of the work for recording the "as built" condition. After completion of the work, the Contractor shall carefully mark the work as actually constructed, revising, deleting and adding to the Drawing Sheets as required. The following requirements shall be complied with:
1. Cable Size and Type: Provide the size and type of each cable installed on project.
 2. Substructure: Where the location of all underground conduits, pull boxes, stub ups and etc. where are found to be different than shown, carefully mark the correct location on the Drawings. Work shall be dimensioned from existing improvements.
 3. Size of all conduit runs.
 4. Routes of concealed conduit runs and conduit runs below grade.
 5. Homerun points of all branch circuit.
 6. Location of all switchgear, panels, MCC, lighting control panels, pullcans, etc.
 7. Changes made as a result of all approved change orders, addendums, or field authorized revisions.
 8. As Built: At the completion of the Work the Contractor shall review, certify, correct and turn over the marked up Drawings to the Architect for his use in preparing "as built" plans.
 9. As built Drawings shall be delivered to the Architect within ten (10) days of completion of construction.

3.7 Clean Up:

- A. Upon completion of electrical work, remove all surplus materials, rubbish, and debris that accumulated during the construction work. Leave the entire area neat, clean, and acceptable to the Architect.

3.8 Mechanical and Plumbing Electrical Work:

- A. The requirements for electrical power and/or devices for all mechanical and plumbing equipment supplied and/or installed under this Contract shall be coordinated and verified with the following:
1. Mechanical and Plumbing Drawings.
 2. Mechanical and Plumbing sections of these Specifications.
 3. Manufacturers of the Mechanical and Plumbing equipment supplied.

- B. The coordination and verification shall include the voltage, ampacity, phase, location and type of disconnect, control, and connection required. Any changes that are required as a result of this coordination and verification shall be a part of this Contract.
- C. The Electrical Contractor shall furnish and install the following for all mechanical and plumbing equipment:
1. Line voltage conduit and wiring.
 2. Disconnect switches.
 3. Manual line motor starters.
- D. Automatic line voltage controls and magnetic starters shall be furnished by the Mechanical and/or Plumbing Contractor and installed and connected by the Electrical Contractor. When subcontracted for by the Mechanical and/or Plumbing Contractor, all line voltage control wiring installed by the Electrical Contractor shall be done per directions from the Mechanical and/or Plumbing Contractor.
- E. All low voltage control wiring for Mechanical and Plumbing equipment shall be installed in conduit. Furnishing, installation and connection of all low voltage conduit, boxes, wiring and controls shall be by the Mechanical and/or Plumbing Contractor.
- F. Disconnects (Motor And Circuit)
1. Disconnect switches shall be as manufactured by ITE- Siemens, General Electric or Square D.
- G. Disconnects (Motor: Fused):
1. Disconnect switches shall be provided and located at all motors.
 2. Switches for three-phase motors shall be heavy-duty, horsepower rated three-pole, and surface mounted except as noted on drawings.
 3. Switches containing more than three poles shall be as specified on the drawings.
 4. Switches for single-phase, fractional horsepower motors shall be heavy-duty, horsepower rated.
 5. Switches shall be horsepower rated.
- G. Manual motor starters, where required, shall have toggle type operators with pilot light and melting alloy type overload relays, SQUARE D COMPANY, Class 2510, Type FG-1P (surface) or Type FS-1P (flush) or ITE, WESTINGHOUSE or GENERAL ELECTRIC equal.

END OF SECTION

SECTION 260519 - LINE VOLTAGE WIRE AND CABLE

PART 1 - GENERAL

1.1 Description of Work:

- A. The work of this Section consists of providing all wire and cable rated 600 volts or less, including splices and terminations, as shown on the Drawings and as described herein.

1.2 Related Work:

- A. See the following Specification Section for work related to the work in this Section:
 - 1. 260542 Conduits, Raceways and Fittings.
 - 2. 260533 Junction and Pull Boxes.

1.3 Quality Assurance

- A. Field tests shall be performed as specified in paragraph 3.04 of this Section.

PART 2 - PRODUCTS

2.1 Conductors:

- A. Conductors shall be copper, type THHN/THWN/MTW oil and gasoline resistant, 600 volt rated insulation.
- B. Conductors shall be stranded copper.
- C. Minimum power and control wire size shall be No. 12 AWG unless otherwise noted.
- D. All conductors used on this Project shall be of the same type and conductor material.

2.2 Cables:

- A. All individual conductors shall be copper with type THHN/THWN, 600 volt rated insulation.
- B. Insulation Marking - All insulated conductors shall be identified with printing colored to contrast with the insulation color.
- E. Color Coding - As specified in paragraph 3.03.

- F. Special Wiring - Where special wiring is proposed by an equipment manufacturer, submit the special wiring requirements to the Owner's Representative and, if approved, provide same. Special wire shall be the type required by the equipment manufacturer.
- G. Other Wiring - Wire or cable not specifically shown on the Drawings or specified, but required, shall be of the type and size required for the application and as approved by the Owner's Representative.
- H. Manufacturer - Acceptable manufacturers including Cablec, Southwire, or equal.

2.3 Terminations:

- A. Manufacturer - Terminals as manufactured by T&B, Burndy or equal.
- B. Wire Terminations – Stranded conductors shall be terminated in clamping type terminations which serve to contain all the strands of the conductor. Curling of a stranded conductor around a screw type terminal is not allowed. For screw type terminations, use a fork type stake-on termination on the stranded conductor. Use only a stake-on tool approved for the fork terminals selected.
- C. End Seals - Heat shrink plastic caps of proper size for the wire on which used.

2.4 Tape:

- A. Tape used for terminations and cable marking shall be compatible with the insulation and jacket of the cable and shall be of plastic material.

PART 3 - EXECUTION

3.1 Cable Installation:

- A. Clean Raceways - Clean all raceways prior to installation of cables as specified in Section 260542 - Conduits Raceway and Fittings.
- B. All line voltage wiring shall be installed in conduit.
- C. All feeder conductors shall be continuous from equipment to equipment. Splices in feeders are not permitted unless specifically noted or approved by the Electrical Engineer.
- D. All branch circuit wiring shall be run concealed in ceiling spaces, walls, below floors or in crawl spaces unless noted otherwise.
- E. Cable Pulling - Exercise care in pulling wires and cables into conduit or wireways so as to avoid kinking, putting undue stress on the cables or otherwise abrading them. No grease will be permitted in pulling cables. Only soapstone, talc, or UL listed pulling compound

will be permitted. The raceway construction shall be complete and protected from the weather before cable is pulled into it. Swab conduits before installing cables and exercise care in pulling, to avoid damage to conductors.

- F. Bending Radius - Cable bending radius shall be per applicable code. Install feeder cables in one continuous length.
- G. Equipment Grounding Conductors - Provide an equipment grounding conductor, whether or not it is shown on the Drawings, in all conduits or all raceways.
- H. Panelboard Wiring - In panels, bundle incoming wire and cables which are No. 6 AWG and smaller, lace at intervals not greater than 6 inches, neatly spread into trees and connect to their respective terminals. Allow sufficient slack in cables for alterations in terminal connections. Perform lacing with plastic cable ties or linen lacing twine. Where plastic panel wiring duct is provided for cable runs, lacing is not necessary when the cable is properly installed in the duct.

3.2 Cable Terminations and Splices:

- A. Splices - UL Listed wirenuts.
- B. Terminations - Shall comply with the following:
 - 1. Make up and form cable and orient terminals to minimize cable strain and stress on device being terminated on.
 - 2. Burnish oxide from conductor prior to inserting in oxide breaking compound filled terminal.

3.3 Circuit and Conductor Identification:

- A. Color Coding - Provide color coding for all circuit conductors. Insulation color shall be white for neutrals and green for grounding conductors. Conductor colors shall be as follows:

<u>VOLTAGE</u>	<u>208/120V</u>	<u>480/277V</u>
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Neutral	White	Grey
Ground	Green	Green

- B. Color coding shall be in the conductor insulation for all conductors #10 AWG and smaller; for larger conductors, color shall be either in the insulation or in colored plastic tape applied at every location where the conductor is readily accessible.

- C. Circuit Identification - All underground distribution and service circuits shall be provided with plastic identification tags in each secondary box and at each termination. Tags shall identify the source transformer of the circuit and the building number(s) serviced by the circuit.

3.4 Field Tests:

- A. All systems shall test free from short circuits and grounds, shall be free from mechanical and electrical defects, and shall show an insulation resistance between phase conductors and ground of not less than the requirements of the CEC. All circuits shall be tested for proper neutral connections.
- B. Insulation Resistance Tests: Perform insulation resistance tests on circuits with #2 AWG and larger conductors to be energized with a line-to-neutral voltage of 120 volts or more. Make these tests before all equipment has been connected. Test the insulation with a 500Vdc insulation resistance tester with a scale reading 100 megohms. The insulation resistance shall be 2 megohms or more. Submit results for review.

END OF SECTION

SECTION 260526 – GROUNDING

PART 1 - GENERAL

1.1 Section Includes:

- A. Conduits, wires, ground rods and other materials for the electrical grounding system.

1.2 Related Sections:

- A. Section 260500 - Electrical General Requirements.

PART 2 - PRODUCTS

2.1 Ground Rod:

- A. "Copperweld" ground rod conforming to or exceeding requirements of U.L. Specification No. 467 (ANSI C-33.8). Rod shall be 3/4" diameter and 10' in length, unless otherwise noted on the Drawings.

2.2 Below Grade Connections:

- A. Compression fittings, Thomas & Betts, Series 52000, 53000 or 54000 or approved equal.

2.3 Hardware:

- A. Bolts, nuts and washers shall be bronze, cadmium plated steel or other non-corrosive materials, approved for the purpose.

2.4 Waterproof Sealant:

- A. Use Kearney "Aqua Seal" mastic sealant on all below grade clamp or compression type connections.

PART 3 - EXECUTION

3.1 Grounding and Bonding:

- A. Grounding and bonding shall be as required by codes and local authorities.
- B. All electrical equipment shall be grounded, including, but not limited to, panel boards, terminal cabinets and outlet boxes.
- C. The ground pole of receptacles shall be connected to their outlet boxes by means of a copper ground wire connecting to a screw in the back of the box.

- D. A green insulated copper ground wire, sized to comply with codes, shall be installed in all conduit runs.
- E. All metal parts of pull boxes shall be grounded per code requirements.
- F. All ground conductors shall be green insulated copper.
- G. The ground system electrodes shall be tested for resistance before the equipment ground conductors are connected. Maximum ground system resistance shall be 25 ohms. Install up to two additional ground rods to meet the 25 ohm requirement. Multiple ground rods shall not be less than 10 feet apart.
- H. Grounding of the panels shall be completed as indicated on the Drawings.

END OF SECTION

SECTION 260533 – OUTLET, JUNCTION AND PULL BOXES

PART 1 - GENERAL

1.1 Description of Work:

- A. The work of this Section consists of providing all required labor, supervision, materials and equipment to satisfactorily complete all electrical installations shown on the drawings, included in these Specification, or otherwise needed for a complete and fully operating facility. The work shall include but not be limited to the following:
- B. Furnish and install all required material, supports and miscellaneous material for the satisfactory interconnection of all associated electrical systems.

1.2 Related Work:

- A. See the following specification sections for work related to the work of this section.
 - 1. 260500 General Electrical Requirements.
 - 2. 260542 Conduits, Raceway and Fittings.
 - 3. 260519 Line Voltage Wire and Cable.

PART 2 - PRODUCTS

2.1 Outlet boxes, Junction and Pull boxes

- A. Standard Outlet Boxes: Galvanized, steel, knock-out type of size and configuration best suited to the application indicated on the Drawings. Minimum box size shall be 4 inches square (octagon for most light fixtures) by 1-1/2 inches deep with mud rings as required.
- B. Switch boxes: Minimum box size shall be 4 inches square by 1-1/2 inches deep with mud rings as required. Install multiple switches in standard gang boxes with raised device covers suitable for the application indicated.
- C. Conduit bodies: Cadmium plated, cast iron alloy. Conduit bodies with threaded conduit hubs and neoprene gasketed, cast iron covers. Bodies shall be used to facilitate pulling of conductors or to make changes in conduit direction only. Splices are not permitted in conduit bodies. Crouse-Hinds Form 8 Condulets, Appleton Form 35 Unilets or equal.
- D. Sheet Metal Boxes: Use standard outlet or concrete ring boxes wherever possible; otherwise use a minimum 16 gauge galvanized sheet metal, NEMA I box sized to Code requirements with covers secured by cadmium plated machine screws located six inches on centers. Circle AW Products, Hoffman Engineering Company or equal.
- E. Flush Mounted Pull boxes and Junction boxes: Provide overlapping covers with flush head cover retaining screws, prime coated.

PART 3 - EXECUTION

3.1 Outlet Boxes

A. General:

1. All outlet boxes shall finish flush with building walls, ceilings and floors except in mechanical and electrical rooms above accessible ceiling or where exposed work is called for on the Drawings.
2. Install raised device covers (plaster rings) on all switch and receptacle outlet boxes installed in masonry or stud walls or in furred, suspended or exposed concrete ceilings. Covers shall be of a depth to suit the wall or ceiling finish.
3. Leave no unused openings in any box. Install close-up plugs as required to seal openings.

B. Box Layout:

1. Outlet boxes shall be installed at the locations and elevations shown on the drawings or specified herein. Make adjustments to locations as required by structural conditions and to suit coordination requirements of other trades.
2. Locate switch outlet boxes on the latch side of doorways.
3. Outlet boxes shall not be installed back to back nor shall through-wall boxes be permitted. Outlet boxes on opposite sides of a common wall shall be separated horizontally by at least one stud or vertical structural member.
4. For outlets mounted above counters, benches or backsplashes, coordinate location and mounting heights with built-in units. Adjust mounting height to agree with required location for equipment served.
5. On fire rated walls, the total face area of the outlet boxes shall not exceed 100 square inches per 100 square feet of wall area.

C. Supports:

1. Outlet Boxes installed in metal stud walls shall be equipped with brackets designed for attaching directly to the studs or shall be mounted on specified box supports.
2. Fixture outlet boxes installed in suspended ceiling of gypsum board or lath and plaster construction shall be mounted to 16 gauge metal channel bars attached to main ceiling runners.
3. Fixture outlet boxes installed in suspended ceilings supporting acoustical tiles or panels shall be supported directly from the structure above where pendant mounted lighting fixture are to be installed on the box.

4. Fixture Boxes above tile ceilings having exposed suspension systems shall be supported directly from the structure above.
5. Outlet and / or junction boxes shall not be supported by grid or fixture hanger wires at any locations.

3.2 Junction And Pull Boxes

A. General:

1. Install junction or pull boxes where required to limit bends in conduit runs to not more than 360 degrees or where pulling tension achieved would exceed the maximum allowable for the cable to be installed. Note that these boxes are not shown on the Drawings.
2. Locate pull boxes and junction boxes in concealed locations above accessible ceilings or exposed in electrical rooms, utility rooms or storage areas.
3. Install raised covers (plaster rings) on boxes in stud walls or in furred, suspended or exposed concrete ceilings. Covers shall be of a depth to suit the wall or ceiling finish.
4. Leave no unused openings in any box. Install close-up plugs as required to seal openings.
5. Identify circuit numbers and panel on cover of junction box with black marker pen.

B. Box Layouts:

1. Boxes above hung ceilings having concealed suspension systems shall be located adjacent to openings for removable recessed lighting fixtures.

C. Supports:

1. Boxes installed in metal stud walls shall be equipped with brackets designed for attaching directly to the studs or shall be mounted on specified box supports.
2. Boxes installed in suspended ceilings of gypsum board or lath and plaster construction shall be mounted to 16 gauge metal channel bars attached to main ceiling runners.
3. Boxes installed in suspended ceilings supporting acoustical tiles or panels shall be supported directly from the structure above.
4. Boxes mounted above suspended acoustical tile ceilings having exposed suspension systems shall be supported directly from the structure above.

END OF SECTION

SECTION 260542 - CONDUITS, RACEWAYS AND FITTINGS

PART 1 - GENERAL

1.1 Description of Work:

- A. The work of this section consists of furnishing and installing conduits, raceways and fittings as shown on the Drawings and as described herein.

1.2 Related Work:

- A. See the following specification sections for work related to the work in this section:
 - 1. 260543 Underground Ducts
 - 2. 260544 In Grade Pull Boxes
 - 3. 260519 Line Voltage Wire and Cable
 - 4. 260533 Junction and Pull Boxes

PART 2 - PRODUCTS

2.1 Conduits, Raceways:

- A. Electrical Metallic Tubing (EMT) shall be hot-dip galvanized after fabrication. Couplings shall be compression or set-screw type.
- B. Flexible Conduit: Flexible metal conduit shall be galvanized steel.
- C. Galvanized Rigid Steel Conduit (GRS) shall be hot-dip galvanized after fabrication. Couplings shall be threaded type.
- D. Rigid Non-metallic Conduit: Rigid non-metallic conduit shall be PVC Schedule 40 (PVC-40 or NEMA Type EPC-40) conduit approved for underground use and for use with 90° C wires.

2.2 Conduit Supports:

- A. Supports for individual conduits shall be galvanized malleable iron one-hole type with conduit back spacer.
- B. Supports for multiple conduits shall be hot-dipped galvanized Unistrut or Superstrut channels, or approved equal. All associated hardware shall be hot-dip galvanized.
- C. Supports for EMT conduits shall be galvanized pressed steel single hole straps.
- D. Clamp fasteners shall be by wedge anchors. Shot in anchors shall not be allowed.

2.3 Fittings:

- A. Provide threaded-type couplings and connectors for rigid steel conduits; provide steel compression (watertight), or steel set-screw type for EMT, (die-cast zinc or malleable iron type fittings are not allowed). Provide threaded couplings and Meyers hubs for rigid steel conduit exposed to weather.
- B. Fittings for flexible conduit shall be Appleton, Chicago, IL, Type ST, O-Z Gedney Series 4Q by General Signal Corp., Terryville, CT, T & B 5300 series, or approved equal.
- C. Fittings for use with rigid steel shall be galvanized steel or galvanized cast ferrous metal; access fittings shall have gasketed cast covers and be Crouse Hinds Condulets, Syracuse, NY, Appleton Unilets, Chicago, IL, or approved equal. Provide threaded-type couplings and connectors; set-screw type and compression-type are not acceptable.
- D. Fittings for use with rigid non-metallic conduit shall be PVC and have solvent-weld-type conduit connections.
- E. Union couplings for conduits shall be the Erickson type and shall be Appleton, Chicago, IL, Type EC, O-Z Gedney 3-piece Series 4 by General Signal Corp., Terryville, CT, or approved equal. Threadless coupling shall not be used.
- F. Bushings:
 - 1. Bushings shall be the insulated type.
 - 2. Bushings for rigid steel shall be insulated grounding type, O-Z Gedney Type HBLG, Appleton Type GIB, or approved equal.
- G. Conduit Sealants:
 - 1. Fire Retardant Types: Fire stop material shall be reusable, non-toxic, asbestos-free, expanding, putty type material with a 3-hour rating in accordance with UL Classification 35L4 or as specified on the Drawings.

PART 3 - EXECUTION

3.1 Conduit, Raceway and Fitting Installation:

- A. For conduit runs exposed to weather provide rigid metal (GRS).
- B. For conduit run underground, in concrete or masonry block wall and under concrete slabs, install minimum ¾" size nonmetallic (PVC) with PVC elbows. Where conduits transition from underground or under slab to above grade install wrapped rigid metal (GRS) elbows and risers.
- C. For conduit runs concealed in steel or wood framed walls or in ceiling spaces or exposed in interior spaces above six feet over the finished floor, install EMT.

- D. Flexible metal conduit shall be used only for the connection of recessed lighting fixtures and motor connections unless otherwise noted on the Drawings. Liquid-tight steel flexible conduit shall be used for motor connections.
- E. The minimum size raceway shall be 1/2-inch unless indicated otherwise on the Drawings.
- F. Installation shall comply with the CEC.
- G. From pull point to pull point, the sum of the angles of all of the bends and offset shall not exceed 360 degrees.
- H. Conduit Supports: Properly support all conduits as required by the NEC. Run all conduits concealed except where otherwise shown on the drawings.
 - 1. Exposed Conduits: Support exposed conduits within three feet of any equipment or device and at intervals not exceeding NEC requirements; wherever possible, group conduits together and support on common supports. Support exposed conduits fastened to the surface of the concrete structure by one-hole clamps, or with channels. Use conduit spacers with one-hole clamps.
 - a. Conduits attached to walls or columns shall be as unobtrusive as possible and shall avoid windows. Run all exposed conduits parallel or at right angles to building lines.
 - b. Group exposed conduits together. Arrange such conduits uniformly and neatly.
 - 2. Support all conduits within three feet of any junction box, coupling, bend or fixture.
 - 3. Support conduit risers in shafts with Unistrut Superstrut, or approved equal, channels and straps.
- I. Moisture Seals: Provide in accordance with NEC paragraphs 230-8 and 300-5(g).
- J. Where PVC conduit transitions from underground to above grade, provide rigid steel 90's with risers. Rigid steel shall be half-lap wrapped with 20 mil tape and extend minimum 12" above grade.
- K. Provide a nylon pull cord in each empty raceway.
- L. Provide galvanized rigid steel factory fittings for galvanized rigid steel conduit.
- M. Slope all underground raceways to provide drainage; for example, slope conduit from equipment located inside a building to the pull box or manhole located outside the building.
- N. Conduits shall be blown out and swabbed prior to pulling wires, or installation of pull cord in empty conduits.

END OF SECTION

SECTION 260543 – UNDERGROUND DUCTS

PART 1 - GENERAL

1.1 Description of Work:

- A. The work of this section consists of furnishing and installing raceways, and raceway spacers with necessary excavation.

1.2 Related Work:

- A. See the following specification sections for work related to the work of this section.
 - 1. 312316 Excavation.
 - 2. 312333 Backfill.
 - 2. 260542 Conduit Raceway and Fittings.

1.3 Standards and Codes:

- A. Work and material shall be in compliance with and according to the requirements of the latest revision of the following standards and codes.
 - 1. National Electrical Code (NEC) (Latest Revision)
 - 2. California Electrical Code (CEC).
 - 3. Underground Installations CEC - Article 300.5
 - 4. Rigid NonMetallic Conduit CEC - Article 347

PART 2 - PRODUCTS

2.1 Raceways:

- A. As specified in Section 260542 Conduits, Raceways and Fittings.

PART 3 - EXECUTION

3.1 Excavation:

- A. As specified in Section 02200, Excavation and Backfill and as required for the work shown on the Drawings.

3.2 Install raceways as indicated on drawings.

Project: 855 East Laurel Drive Emergency Shelter
Project No. 8875
Bid No. 10736

3.03 Sand Encasement:

A. As specified in Section 312316 - Excavation.

3.04 Backfill:

A. As specified in Section 312333 - Backfill.

END OF SECTION

SECTION 260544 - IN GRADE PULL BOXES

PART 1 - GENERAL

1.1 Description of Work:

- A. The work of this section consists of providing all labor, supervision, tools, materials, and performing all work necessary to furnish and install pre-cast concrete vaults, and pull boxes with necessary excavation.

1.2 Related Work:

- A. See the following specification sections for work related to the work of this section.
 - 1. 312316 Excavation.
 - 2. 312333 Backfill.
 - 2. 260543 Underground Ducts.

1.3 Submittals:

- A. As specified in Section 260500 and Division 01.
 - 1. Catalog Data: Provide manufacturer's descriptive literature - Pre-cast Vaults, Pull Boxes and Accessories.

PART 2 - PRODUCTS

2.1 Materials and Equipment:

A. General Requirements:

- 1. Pull boxes for electrical power, controls and other communication circuits shall consist of pre-cast reinforced concrete boxes, extensions' bases, and covers as specified herein and as indicated on the Drawings. Pre-cast units shall be the product of a manufacturer regularly engaged in the manufacture of pre-cast vaults and pull boxes. Acceptable manufacturers are Christy, Utility Vault, Brooks, Associated Concrete or equal.

B. Construction:

- 1. Pre-cast concrete vaults and pull boxes for electrical power distribution and communication circuits with associated risers and tops shall conform to ASTM C478 and ACI 318. Pull boxes shall be the type noted on the Drawings and shall be constructed in accordance with the applicable details as shown. Tops and walls shall consist of reinforced concrete. Walls and bottom shall be of monolithic concrete

construction. Duct entrances and windows shall be located near the corners of structures to facilitate cable racking.

C. Covers:

1. The word "ELECTRICAL" shall be cast in the top face of all electrical cable boxes. The word "Signal" or "Fire Alarm" shall be cast in the top of the boxes utilized for these systems.

PART 3 - EXECUTION

3.1 Installation:

- A. Install pull boxes where required to limit bends in conduit runs to not more than 360 degrees or where pulling tension achieved would exceed the maximum allowable for the cable to be installed. Note that these boxes are not shown on the Drawings.
- B. Pre-cast pull boxes shall be installed approximately where indicated on the Drawings. The exact location of each pull box shall be determined after careful consideration has been given to the location of other utilities, grading, and paving. All cable boxes and secondary pull boxes shall be installed with a minimum of 6-inch thick crushed rock or sand bedding.
- C. Paved areas - Vaults and pull boxes located in areas to be paved shall be installed such that the top of the cover shall be flush with the finished surface of the paving.
- D. Unpaved Areas - In unpaved areas, the top of vaults and pull box covers shall be approximately 2 inches above finished grade.
- E. Joint Seals - Section joints of pre-cast vaults and pull boxes shall be sealed with compound as recommended by the manufacturer.
- F. Trenching, Backfilling, and Compaction - Trenching, backfilling and compaction shall be as specified in Section 02200 - Excavation and Backfill.

END OF SECTION

SECTION 26 24 13 - SWITCHBOARDS, 600 VOLTS AND BELOW

PART 1 – GENERAL

1.1 Description of Work: The work of this Section consists of providing switchboards, as shown on the Drawings and as described herein.

1.2 Related Work:

A. See the following Specification Sections for work related to the work in this Section.

1. 260519 Line Voltage Wire and Cable
2. 262200 Transformers
3. 262816 Circuit Breakers

1.3 Submittals:

A. Shop Drawings - As specified in Section 260500 and Division 01. For each switchboard furnished under this Contract, submit manufacturer's name, catalog data, and the following information:

1. Switchboard type.
2. Main bus and terminal connection sizes.
3. Location of line connections.
4. Section dimensions.
5. Gutter space.
6. Gauge of boxes and fronts.
7. Finish data.
8. Voltage rating.
9. Breaker manufacturer, types, trip ratings, and interrupting ratings.

B. Before construction of the main (service) switchboard, the contractor shall deliver two or more copies of the switchboard submittal to P.G.&E. for their approval. The contractor shall deliver one P.G.&E. approved copy of the submittal to the Electrical Engineer for record.

- C. Submit operation and maintenance data for switchboards, and circuit breakers including nameplate data, parts lists, manufacturer's circuit breaker time current coordination curves, factory and field test reports, recommended maintenance procedures and typewritten as-built panel and switchboard schedules. Submit in accordance with Division 01.

1.4 Warranty

- A. Manufacturer shall warrant equipment to be free from defects in materials and workmanship for the lesser of one (1) year from date of installation or eighteen (18) months from date of purchase

PART 2 – PRODUCTS

2.1 Switchboards:

- A. General: Switchboards shall be designed, built and tested in accordance with applicable portions of the latest NEMA, EUSERC, and Underwriter Laboratories standards and the latest requirements of the California Electrical Code. All sections and devices shall be UL listed and labeled.
 - 1. Switchboards shall be dead front, completely self-supporting structure of the required number of vertical sections bolted together to form one metal, totally enclosed, switchboard. Sides, top, and rear covers shall be code gauge steel, bolted to the switchboard structure.
 - 2. The switchboard shall be furnished with phase and neutral busses of the amps, volts and phase shown on the Drawings. The bus shall extend the full length of the switchboard. Tapered bus is not acceptable. The switchboard sections, when called for on the plans, shall be as follows:
 - a. Metering Section and landing lugs; Fully Pacific Gas & Electric Company compatible.
 - b. All sections shall include full capacity busing between sections.
 - c. All sections shall be front aligned and shall have front-connected devices.
 - 3. All buses shall be silver plated copper, supported with high impact, non-tracking insulating material, braced to withstand the mechanical forces exerted during short circuit conditions. The current density of the bus shall not exceed 1000 amperes per square inch of cross section area or the switchboard busing shall be of sufficient cross-sectional area to meet UL standard 891 for temperature rise. Provisions shall be provided for future splicing of additional sections from either end. The neutral bus shall be 100% rated.

4. A ground bus shall be furnished secured to each vertical section structure, and shall extend the entire length of the switchboard. The ground bus shall be sized per UL standard 891 and be of the same material as the through bus.
5. The neutral bus in the feeder sections shall be not further than 20 inches from the front of the switchboard.
6. Vertical main bus bars shall be furnished full height to accommodate future branch devices.
7. The switchboard shall be furnished and installed complete with all underground pull sections, utility sections, main device and feeder sections as indicated on the Drawings. Underground pull sections, utility cable termination, transformer and metering sections shall be in accordance with Pacific Gas and Electric Company requirements.
8. The main device, where indicated to be individually mounted, shall be completely isolated from the utility and the feeder sections of the switchboard, both in the device section and the cable section of the switchboard cubicle. The cable section shall also be isolated from the main horizontal bus. The main device cubicle shall have UL service equipment label.
9. Feeder devices shall be group-mounted and be front accessible, furnished with vertical wiring gutter on the front of the distribution sections. Wiring gutters shall be furnished with hinged, code gauge steel formed covers. Unused device space shall be covered with blank code gauge steel covers.
10. All vertical sections comprising the switchboard shall be aligned front and rear.
11. Switchboards for outdoor installation shall be furnished in [stainless steel] NEMA 3R non-walk-in enclosures provided with thermostatically controlled space heaters in each vertical section. Space heaters shall be powered from a circuit breaker protected circuit originating within the switchboard and shall be sized adequately to prevent the formation of condensation. Space heater shall be suitable for operation at 120V AC.
12. All steel surfaces are to be chemically cleaned and treated, providing a bond between paint and metal surfaces to help prevent the entrance of moisture and formation of rust under the paint finish. Switchboard exterior shall be furnished with a grey enamel finish color over a rust inhibiting primer, unless otherwise noted.

B. Circuit Breakers

1. Circuit breakers, unless otherwise indicated, shall be the molded case type with ratings as indicated on the Drawings. Circuit breakers shall meet the requirements specified under Section 262816 - Circuit Breaker.

2. Main circuit breakers, where indicated to be Molded case type, shall be 80 [100] percent rated, with the frame size and trip plug ratings shown.

C. Customer Metering

1. Instrument Transformers

- a. Current transformers shall be window type conforming to, one per phase, Square D Company Class 4210, General Electric JAG-O or equal.
- b. Potential transformers shall be fixed mounted, type Square D Company Class 4210, General Electric JVM, or equal.

2. Power Monitors and Meters

- a. The Customer Metering equipment shall be manufactured by Square D Company, General Electric or equal.
- b. Substitutions: substitutions shall be made only after proper verification
- c. The switchboard shall be metered using:
 - i. [Square D Type PM 650] [Square D Type CM 2350]
 - ii. [Square D Type PM 650]
 - (A). Digital Power Meter with 0.25% accuracy with the following features:
 - (B). A, V, kW, kVAR, kVA, PF, F, kWh, kVARh, kVAh, KYZ, RS-485 communications, THD, Demand, kWd, kVARd, kVAd, date/time stamping,
 - (C). predicted power demand, onboard alarms, min/max. readings, data log, event log
 - iii. [Square D Type CM 2350]
 - (A). Digital Circuit Monitor with 0.2% accuracy with the following features:
 - (B). A, V, kW, kVAR, kVA, PF, F, THD, K-Factor, kWh, kVARd, kVAd, kVARh, kVAh, KYZ output, RS-485 communication port, kWd, kVARd, kVAd, date/time stamping, predicted power demand, onboard alarms, min/max. readings, data log, event log, extend memory (100k), wave form capture, and disturbance monitoring

D. Manufacturer

- a. The switchboard shall be Square D, [or] Siemens, [I.E.M] .[General Electric], [Eaton Cutler Hammer].

PART 3 – EXECUTION

3.1 Installation:

- A. Switchboards shall be installed where indicated on the Drawings, and in accordance with the manufacturer's instructions.
- B. A 1” conduit shall be installed for new PG& E services from the PG& E Metering Section to the Main Telephone Terminal Board.
- C. At switchboards located indoors, a 2” conduit and pull tape shall be installed from outside the switchboard meter cabinet to a location on the exterior of the building. The installation shall meet PG&E Green Book requirements.

3.2 Mounting:

- A. Switchboards shall be mounted on a concrete pad, as indicated on the drawings. Reinforcing shall be as shown on the Drawings. The top surface of the pad shall be 2 inches above the surrounding surface.
- B. The switchboard shall be bolted to the pad with ½ inch diameter bolts minimum at each corner of each section unless otherwise noted.
- C. The switchboard shall be seismically qualified to withstand potential seismic forces up to UBC Seismic Zone 4.

3.3 Padlocks:

- A. Exterior switchboard shall be provided with padlocks keyed as directed by the Owner's Representative. Padlocks shall be supplied by the contractor.

3.4 Field Tests:

- A. Insulation resistance Tests: Perform insulation resistance tests on circuits to be energized with a line-to-neutral voltage of 120 volts or more. Make these tests after all equipment has been connected, except that equipment which may be damaged by the test voltage shall not be connected. Test the insulation with 500V dc insulation resistance tester with a scale reading 100 megohms. The insulation resistance shall be 2 megohm or more. Submit results for review.
- B. Grounding: Grounding shall conform to Section 260526.

Project: 855 East Laurel Drive Emergency Shelter
Project No. 8875
Bid No. 10736

- C. Continuity: Switchboard circuits shall be tested for continuity prior to energizing. continuity tests shall be conducted using a dc device with a bell or buzzer.

END OF SECTION

SECTION 262416 – PANELBOARDS AND DISTRIBUTION PANELS

PART 1 – GENERAL

1.1 Description of Work:

- A. The work of this Section consists of providing panelboards and circuit breakers as shown on the Drawings and as described herein.

1.2 Related Work:

- A. See the following specification sections for work related to the work in this Section.
 - 1. 260519 Line Voltage Wire and Cable
 - 2. 260526 Grounding
 - 3. 262816 Circuit Breakers

1.3 Submittals:

- A. Shop Drawings - As specified in Division 01 and Section 260500. For each panelboard and distribution panel furnished under this Contract, submit manufacturer's name, catalog data, and the following information:
 - 1. Panelboard / distribution panel type.
 - 2. Main bus and terminal connection sizes.
 - 3. Location of line connections.
 - 4. Cabinet dimension.
 - 5. Gutter space.
 - 6. Gauge of boxes and fronts.
 - 7. Finish data.
 - 8. Voltage rating.
 - 9. Breaker manufacturer, types, trip rating, and interrupting ratings.
 - 10. When information is available on the Drawings, show breaker circuit numbers and locations along with trip ratings on a panelboard layout.

- B. Single Submittal - A single complete submittal is required for all products covered by this Section.
- C. Closeout Submittals: Submit operation and maintenance data for panelboards and circuit breakers including nameplate data, parts lists, factory and field test reports, recommended maintenance procedures and typewritten as-built panel schedules. Submit in accordance with Division 01.

PART 2 – PRODUCTS

2.1 Panelboards:

- A. General: Lighting and Receptacle Panelboards shall be the automatic circuit breaker type. The number and arrangement of circuits, trip ratings, spares and blank spaces for future circuit breakers shall be as shown on the Drawings or, if not shown, 42 circuits. All circuit breakers shall be quick-make, quick-break, thermal-magnetic, bolt-on type (unless otherwise noted on drawings), with 1, 2 or 3 poles as shown, each with a single operating handle. Tandem or piggy-back breakers shall not be used.
- B. Nameplates:
 - 1. Each panelboard shall have a field mounted identifying, rigid, plastic nameplate giving the panel identification as shown on the Drawings.
 - 2. Each panelboard shall have a manufacturer's nameplate showing the voltage, bus rating, number of phases, frequency and number of wires.
- C. Construction:
 - 1. Door and trim shall be finished to match finish type and color of surrounding wall. Box shall be hot-dip galvanized, and field finished to match the front.
 - 2. Panelboards and enclosures shall conform to requirements of all relevant codes. Panelboards shall be suitable for use as service equipment.
 - 3. Panelboards shall be furnished with hinged trim fronts with key latch and a typed directory card and holder. Panelboard circuits shall be arranged with odd numbers on the left and even numbers on the right. Provide weatherproof, NEMA type 3R enclosures for outdoor installation.
- D. Busbars: Panelboard busbars shall be phase sequence type suitable for bolt-on circuit breakers. All busbars shall be copper.
- E. Circuit Breakers: Circuit breakers shall be the molded case type with trip and interrupting ratings as shown on the Drawings.
- F. Manufacturer:

1. Panelboard manufacturer shall be Square D, Siemens, General Electric], or Eaton Cutler Hammer. Panelboards shall be of the same manufacturer as the switchboard.

PART 3 – EXECUTION

- 3.1 Installation: Panelboards and Distribution Panels shall be installed where indicated on the Drawings, and in accordance with the manufacturer's instructions.
- 3.2 Mounting:
 - A. Panelboards and Distribution Panels shall be mounted with the top of the box 6'-6" above the floor. Panelboards and Distribution Panels shall be plumb within 1/8-inch. The highest breaker operating handle shall not be higher than 72 inches above the floor.
- 3.3 Field Tests:
 - A. Insulation Resistance Tests: Perform insulation resistance tests on circuits with #2 AWG and larger conductors to be energized with a line-to-neutral voltage of 120 volts or more. Make these tests after all equipment has been connected, except that equipment which may be damaged by the test voltage shall not be connected. Test the insulation with a 500Vdc insulation resistance tester with a scale reading 100 megohms. The insulation resistance shall be 2 megohms or more. Submit results for review.
 - B. Grounding: Grounding shall conform to Section 260526.
 - C. Continuity: Panelboard and Distribution Panel circuits shall be tested for continuity prior to energizing. Continuity tests shall be conducted using a dc device with a bell or buzzer.

END OF SECTION

SECTION 262726 – DEVICES WIRING

PART 1 – GENERAL

1.1 Description of Work

A. The work of this section consists of:

1. Furnishing, installing, and connecting all duplex receptacles complete with wall plates and/or covers, as shown on the Drawings.
2. Furnishing, installing and connecting all light switches complete with wall plates and or handle operators, as shown on the Drawings.

1.2 Related Work:

A. See the following specification sections for work related to the work of this section:

1. 260542 Conduits, Raceways and Fittings.
2. 260519 Line Voltage Wire and Cable.
3. 260533 Junction and Pull Boxes.

1.3 Submittals: As specified in Section 260500 and Division 01.

- ##### A. Submit manufacturers published descriptive literature properly marked to identify the items to be supplied.
- ##### B. A single complete submittal is required for all products covered by this Section.

PART 2 – PRODUCTS

2.1 Receptacles:

A. General - Receptacles shall be heavy duty, high abuse, grounding type.

B. [Tamper Resistant] Duplex Receptacles:

1. Receptacles shall be specification grade, rated 20 ampere, two-pole, 3-wire, 125 volt, NEMA 5-20 configuration, self-grounding with screw terminals. Color shall be as selected by the Architect.
2. Devices shall have a nylon face, back and side wired.
3. Manufacturer: Hubbell #DR20 Series [Hubbell #DR20__ TR], Leviton #16352 Series [Leviton # 16352-TRE __ Series].

C. GFCI Receptacles[Tamper Resistant]:

1. Device shall be rated 20 ampere, 2-pole, 3-wire, 120 volt, conforming to NEMA 5-20 configuration. Face shall be nylon composition. Unit shall have an LED type red indicator light, test and reset push buttons. Color shall be as selected by the Architect.
2. GFCI component shall meet UL 943 Class A standards with a tripping time of 1/40 second at 5 milliamperes current unbalance. Operating range shall extend from -31°F to 158°F. Unit shall have transient voltage protection and shall be ceramic encapsulated for protection against moisture.
3. Manufacturer: Hubbell #GF20__LA Series [Hubbell # GFTR20 __ Series], Leviton #GFNT2 Series [Leviton #GFTR2 Series].

D. Weather Resistant GFCI Receptacles:

1. Device shall be rated 20 ampere, 2-pole, 3-wire, 120 volt, conforming to NEMA 5-20 configuration, Face shall be nylon composition. Unit shall have a LED type red indicator light, test and reset push buttons. Color shall be as selected by the architect.
2. GFCI component shall meet UL 943 Class A standards with a tripping time of 1/40 second at 5 milliamperes current unbalance. Operating range shall extend from -31°F to 158°F. Unit shall have transient voltage protection and shall be ceramic encapsulated for protection against moisture.
3. Manufacturer: Hubbell #GFTR20 __ Series, Leviton #GFWR2 Series.

E. Surge Suppression Receptacles:

1. Device shall be rated 20 ampere, 2-pole, 3-wire, 120 volt. Face shall be nylon composition. Unit shall have an LED type "Power-on" indication light and damage-alert audible alarm. Color shall be as selected by the Architect.
2. Surge suppression protection shall be listed to UL standard 1449 and shall instantly absorb a transient surge of 6,000 volts minimum. A minimum of four (4) Metal Oxide Varistors shall be utilized to absorb transients.
3. Manufacturer: Hubbell #HBL8362S Series, Leviton #8380 Series.

2.2 Switches:

- A. Switches shall be rated 20 amperes to 120/277 volts ac. Units shall be flush mounted, self-grounding, quiet operating rocker devices. Rocker color shall be as selected by the Architect.

1. Manufacturer: Hubbell #DS_20__ Series, Leviton #5621 Series. See plans for single pole, three way and four way requirements.
- B. Timed switches: Shall be as designed by Paragon Electric Company # ET2000f or Watt Stopper TS-400 rated for the voltage specified on drawings. Time-out shall be adjustable from 5 minutes up to 12 hours. Unit shall be provided with warning alarm.
- C. Dimmer switches: Switch shall be as specified on drawings, color per architect. Heat fins shall not be removed, where dimmer switches are ganged together, care shall be taken to install correct size backbox to accommodate switches without removing fins.

2.3 Plates:

- A. General - Plates shall be of the style and color to match the wiring devices, and of the required number of gangs. Plates shall conform with NEMA WD 1 , UL 514 and FS W-P-455A. Plates on finished walls shall be non-metallic or stainless steel. Plates on unfinished walls and on fittings shall be of zinc plated steel or case metal and shall have rounded corners and beveled edges.
- B. Non-Metallic: Plates shall be plain with beveled edges and shall be nylon or reinforced fiberglass.
- C. Stainless Steel: Plates shall be .040 inches thick with beveled edges and shall be manufactured from No. 430 alloy having a brushed or satin finish.
- D. Cast Metal: Plates shall be cast or malleable iron covers with gaskets so as to be moisture resistant or weatherproof.
- E. Blank Plates: Cover plates for future telephone outlets shall match adjacent device wall plates in appearance and construction.
- F. Weatherproof Plate: Cover plates in wet and damp locations shall have recessed in-use covers, Taymac or equal. Back box shall be suitable for the wall material where it is installed.
- G. Labeling: All switch and receptacle plates shall be labeled on the top portion of the plate with the panelboard and circuit number serving that device. Lettering shall be 3/16" minimum high, black color, on clear Mylar 3/8" tape. Manufactured by P-touch or equal.

PART 3 – EXECUTION

3.1 Installation of Wiring Devices:

- A. Interior Locations: In finished walls, install each device in a flush mounted box with washers as required to bring the device mounting strap level with the surface of the finished wall. On unfinished walls, surface mount boxes level and plumb.

B. Mounting Heights: Adjust boxes so that the front edge of the box shall not be farther back from the finished wall plane than 1/4-inch. Adjust boxes so that they do not project beyond the finished wall. Height of device shall be as follows unless otherwise noted on the drawings:

1. Receptacles 15 Inches from finished floor to bottom of box.
2. Toggle Switches 48 Inches from finished floor to top of box.

C. Receptacles:

1. Ground each receptacle using a grounding conductor, not a yoke or screw contact.
2. Install receptacles with connections spliced to the branch circuit wiring in such a way that removal of the receptacle will not disrupt neutral continuity and branch circuit power will not be lost to other receptacles in the same circuit.

3.2 Installation of Wall Plates:

- A. General - Plates shall match the style of the device and shall be plumb within 1/16-inch of the vertical or horizontal.
- B. Interior Locations, Finished Walls: Install non-metallic plates so that all four edges are in continuous contact with the finished wall surfaces. Plaster filling will not be permitted. Do not use oversized plates or sectional plates.
- C. Interior (not wet) Locations, Unfinished Walls: Install stainless steel or cast metal cover plates.
- D. Wet Locations: Install cast metal plates with gaskets on wiring devices in such a manner as to provide a rain tight weatherproof installation. Cover shall be [lockable] outdoor "in use" type.
- E. Future Locations: Install blanking cover plates on all unused outlets.

3.3 Tests:

A. Receptacles:

1. After installation of receptacles, energize circuits and test each receptacle to detect lack of ground continuity, reversed polarity, and open neutral condition.

END OF SECTION

SECTION 262816 - CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 Description of Work:

- A. The work of this Section consists of providing circuit breakers as shown on the Drawings and as described herein.

1.2 Related Work: See the following Specification Sections for work related to the work in this Section.

- A. 260500 General Electrical Requirements
- B. 262413 Switchboards
- C. 262416 Panelboards and Distribution Panels

1.3 Submittals:

- A. Shop Drawings - Submittals shall be in accordance with Section 260500 and Division 01. For each circuit breaker furnished under this Contract, submit manufacturer's name, catalog data, and the following information:
 - 1. Terminal connection sizes.
 - 2. Voltage rating.
 - 3. Breaker manufacturer, types, trip ratings and interrupting ratings.
- B. Single Submittal - A single complete submittal is required for all products covered by this Section.
- C. Closeout Submittals: Submit in accordance with and Section 16000 [260500], operation and maintenance data for circuit breakers including nameplate data, parts lists, manufacturer's circuit breaker timer, current, coordination curves, factory and field test reports and recommended maintenance procedures.

PART 2 - PRODUCTS

2.1 Circuit Breaker: Each circuit breaker shall consist of the following:

- A. A molded case breaker with an over center toggle-type mechanism, providing quick-make, quick-break action. Each circuit breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pole. Multipole circuit breakers shall have variable magnetic trip elements which are set by a single adjustment to assure uniform tripping characteristics in each pole. Circuit breakers shall be of the bolt-on type unless otherwise noted.

- B. Breaker shall be calibrated for operation in an ambient temperature of 40°C.
- C. Each circuit breaker shall have trip indication by handle position and shall be trip-free.
- D. Three pole breakers shall be common trip.
- E. The circuit breakers shall be constructed to accommodate the supply connection at either end of the circuit breaker. Circuit breaker shall be suitable for mounting and operation in any position.
- F. Breakers shall be rated as shown on Drawings.
- G. Circuit breaker and/or Fuse/circuit breaker combinations for series connected interrupting ratings shall be listed by UL as recognized component combinations for use in the end use equipment in which it is installed. Any series rated combination used shall be marked on the end use equipment per CEC section 110-22.
- H. Breakers shall be UL listed. Circuit breakers shall have removable lugs.
- I. Lugs shall be UL listed for copper and aluminum conductors.
- J. Breakers shall be UL listed for installation of mechanical screw type lugs.
- K. Circuit breakers serving HACR rated loads shall be HACR type. Circuit breakers serving other motor loads shall be motor rated.

PART 3 - EXECUTION

3.1 Mounting:

- A. The highest breaker operating handle shall not be higher than 72 inches above the floor.

END OF SECTION

SECTION 253213 - DIESEL GENERATOR GEN SET

PART 1 - GENERAL

1.0 RELATED DOCUMENTS

- A. The requirements of the General Conditions, Supplementary General Conditions, and Division 01 General Requirements apply to the work of this Section.

1.1 DESCRIPTION OF WORK:

- A. Work included in this Section: Emergency Generator and Automatic transfer switch systems.
- B. Related work included in other Sections: All other Sections of Division 26.

1.2 SUBMITTALS

- A. Engine.
- B. Generator.
- C. Automatic Transfer Switch.
- D. Sub-base Fuel Tank.
- E. Load Bank.

1.3 PRODUCT HANDLING

- A. All material shall be carefully boxed, crated, or otherwise protected for shipment.
- B. Studs and exposed finished surfaces shall be thoroughly greased before shipment.
- C. Inlets and outlets shall be blanked off or plugged with metal caps or covers properly secured before shipment.

1.4 WARRANTY

- A. The complete standby electric power system, including 1800 RPM engine-generator set equipped with set exerciser "Load bank", and running time meter, shall be warranted for a period of five (5) year or fifteen hundred (1500) operating hours, whichever occurs first, from the date of initial start-up. Multiple warranties for individual components (engine, alternator, controls, etc.) will not be acceptable. Satisfactory warranty documents must be provided. In the judgment of the specifying authority, the manufacturer supplying the warranty for the complete system must

have necessary financial strength and technical expertise with all components supplied to provide adequate warranty support.

PART 2 - PRODUCTS

2.0 EQUIPMENT

- A. General: This system shall include one engine-generator set. Set shall be rated for 100 KW, at 80% PF, 60 Hz, Three Phase, Four wire, 208Y/120 Volt on a continuous standby basis at 1800 RPM. Engine-generator set shall be mounted on suitable structural steel base to maintain proper alignment between components, and each set shall incorporate vibration isolators of type and quality as specified by set manufacturer. The generator set and all controls shall provide for completely automatic unattended operation for the duration of a loss of normal utility power.
- B. Engine: Engine shall be stationary, liquid-cooled, diesel for use with number 2 diesel fuel.
- C. Engine equipment shall include the following:
 - 1. Remote, two wire starting shall be 24 volt DC, solenoid shift, electric starter(s) as required by manufacturer. Two independent systems shall be provided to disconnect the starting circuit upon engine starting.
 - 2. Positive displacement, mechanical full pressure lubrication oil pump, lubricating oil cooler, full flow lubrication oil filters with replaceable elements and dipstick oil level indicator.
 - 3. Primary and secondary fuel filters with replaceable elements, and an engine drive, mechanical, positive displacement fuel pump, all mounted on the engine. Replaceable dry element air cleaner.
 - 4. The engine governor shall maintain frequency regulation within + 3% from no load to full rated load. Engines equipped with hydra-mechanical governors shall have a variable control with positive locking mechanism for manual operation and adjustment. Steady-state operating band shall be + 0.33%.
 - 5. Engine protection devices shall be sensing elements located on the engine to initiate the following preliminary alarms and engine shutdowns:
 - a. Low coolant temperature alarms
 - b. Low lubrication oil pressure alarm
 - c. High coolant temperature alarm
 - d. Low lubrication oil pressure shutdown

- e. High coolant temperature shutdown
 - f. Overspeed shutdown
 - g. Overcrank lockout
6. Engine mounted thermostatically controlled water jacket heater(s) for engine to aid in quick starting. Heater(s) shall be rated 1500 watts, 208 volts, single phase, 60 Hz. Heaters(s) shall be disconnected by an oil pressure switch mounted on engine whenever engine starts. Contractor shall provide proper branch circuit from normal utility power source as required.
- D. Engine Cooling System:
- 1. Engine shall be radiator cooled by engine mounted radiator system including belt-driven pusher fan, coolant pump, and thermostat temperature control. Performance of components shall be as required by set manufacturer.
 - 2. Provide 50% ethylene glycol antifreeze solution to fill engine cooling system.
 - 3. Engine cooling system design shall not only remove heat efficiently from engine, but assure dependable engine performance and long operating life. Exhausting of radiator air from enclosure shall be directed up.
- E. Engine Exhaust System:
- 1. Exhaust silencer shall be provided for the engine of size as recommended by manufacturer. Silencer shall be chambered construction of the critical type. Silencer shall be field mounted on flexible exhaust connector. Noise level shall be maximum of 78dB at 10 feet with minimum back pressure. Exhaust pipe shall be extended straight, 5 feet above enclosure.
 - 2. Provide a suitable rain cap at the stack outlet. Provide all necessary flanges and special fittings, etc. for proper installation.
- F. Engine Fuel System:
- 1. Fuel system shall assure continuous operation and clean fuel to the engine. Tank design shall be sufficient to dissipate heat from adjacent engine; maximum temperature of tank shall not exceed 110 degree F. Tank shall be provided with high and low level alarms.
 - 2. Protection from moving components shall be supplied in accordance with CAL-OSHA standards.
 - 3. The packaging shall include a double wall, sub-base mounted, UL142 listed fuel tank. The tank shall be sized to provide 72 hours of run time.

4. The tank shall include fuel suction and return connections, normal and emergency vents, secondary containment emergency vent and rupture basin sensor, mechanical fuel level indication and a stub-up area convenient for electrical conduit entry.
5. The fuel tank shall use an electric fuel sensor to provide an analog indication of fuel level. The controller shall have a warning indication on low fuel level and provide optional shutdown functionality for low, low fuel level.
6. The fuel tank must be supplied by the engine-generator set manufacturer and be installed before shipment.

G. Generator Control:

1. Provide a lighted, unit mounted control that is factory built, wired, tested, and shock-mounted by the generator manufacturer. Control panel shall be a rigid metal enclosure, mounted on the generator end of the set, containing all devices as specified herein, and as required for described functions. Lift-Off, front- opening door shall provide required access to all components. Control wire shall have termination identification on each wire for ease of tracing. Nameplates shall be provided to identify each device or function and shall be silkscreened black on a white background. Metal enclosures shall be chemically treated and painted manufacturer's standard color.
2. Engine-generator control shall include the following for each unit.
 - a. Two wire, 24 volt DC engine controls including: Digital Engine Monitor of oil pressure, coolant temperature, DC volts, running hours and RPM.
 - b. A manual selector switch providing four control positions. OFF/RESET, AUTO MANUAL, STOP shall be included on the panel. The MANUAL position shall permit the engine to be started locally at the set and run loaded via "Load bank"; the OFF/RESET position shall serve as the RESET for alarm shutdown conditions. AUTO position allows starting from transfer switches. STOP shall stop engine.
 - c. Microprocessor based engine monitoring system of modular design with individual status indicating LED's and signal circuits for connection to remote annunciator's. Status lamps shall be press to test type or shall have press to test switch and shall indicate:
 - i. Control Switch "not in auto" amber
 - ii. Emergency Stop red
 - iii. Over crank lockout red

- | | | |
|-------|----------------------------------|-------|
| iv. | Low oil pressure pre-alarm | red |
| v. | Low oil pressure shutdown | red |
| vi. | Over speed shutdown | red |
| vii. | High water temperature pre-alarm | amber |
| viii. | High water temperature shutdown | amber |
| ix. | Low engine temperature alarm | amber |
| x. | Low fuel level alarm lamp | amber |
| xi. | Low battery voltage | amber |
| xii. | 2 spare lamps | amber |
- d. Emergency stop pushbutton with mushroom head.
- e. Alarm horn and silence pushbutton, ring back type.
- f. All wiring for connection to remote devices (including automatic transfer switch and annunciator) shall be wired to terminal blocks. Contractor shall install stranded control wires for remote devices, properly sized per manufacturer's recommendations.
- g. Panel light and switch.
- h. AC output controls include:
- | | |
|------|---|
| i. | Voltmeter - Digital, 0.5 % |
| ii. | Ammeter - Digital, 0.5 % |
| iii. | Voltmeter- Ammeter phaseselector switch with "OFF" position |
| iv. | Frequency Meter, Digital |
| v. | Running Time Meter |

2.1 AUXILIARY EQUIPMENT

- A. Starting Batteries: A battery set shall be supplied for the engine and shall be mounted as recommended by generator set manufacturer; provide battery racks as required. Battery set shall be 24 volt DC and composed of two 12 volt, heavy duty, diesel starting maintenance free batteries, and each rated at 100 ampere hours at SAE 20 hour rate. All necessary intercell connecting and battery cables shall be provided.

Batteries shall be supplied dry-charged and electrolyte added shortly prior to acceptance tests.

- B. Battery Charger: A current limited automatic battery charger with a charge rate of ten (10) amp shall be provided and installed within the weatherproof generator set. Chargers shall be (24 volt DC) with float, and equalize charge settings. The charger shall be supplied 120 VAC normal power; Contractor shall provide circuit as required.
- C. Vibration Isolators: Each engine-generator shall be mounted on adjustable spring isolators complete with seismic restraints. Engine-generator shall be sized to load the springs within the proper working range. They shall be Caldyn RJSD vibration isolators, or approved equal.

2.2 AUTOMATIC TRANSFER SWITCHES

- A. The automatic transfer switches shall be (1) 100 amp, 120/208 volt, 4-pole, 3 phase, 4 wire, (1) 60 amp, 120/208 volt, 4-pole, 3 phase, 4 wire, and shall be arranged to close a pilot contact for remote starting of the standby plant three (3) seconds after a drop in voltage on any phase to 90% or less. The load circuits shall not be disconnected from the normal source during three (3) second time delay period. When standby generator is delivering not less than 90% of rated voltage and frequency, load circuits shall be transferred. The transfer switch and all accessories shall be U.L. listed.
- B. Upon restoration of the normal source to not less than 95% of rated voltage and rated frequency, load circuits shall be transferred to normal source after a 10-30 minute time delay.
- C. Inspection and replacement of all main and separate arcing contacts (movable and stationary) shall be possible from the front of the switch without any disassembly of operating linkages or power conductors and without removal of the switch from the enclosure.
- D. Normal source and Phase voltage sensor/relays.
- E. A complete circuit diagram shall be attached to the inside of the cabinet door.
- F. A pilot light on the door of the enclosure to indicate transfer switch position.
- G. A key operated test switch on the door of the enclosure shall be provided to simulate a utility outage.
- H. Additional accessory features of minor changes as may be indicated on the Drawings.
- I. Minimum code compliance clearances about automatic transfer switch shall not be violated.
- J. Enclosure shall be weatherproof and skid mounted.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Installation: Emergency electric generating system, generator set, and all components shall be installed, including all connections and platform, at locations and as indicated on drawings and wiring diagrams as specified herein, and in accordance with approved shop drawings, manufacturer's instructions, and manufacturer's standard specification and dimension sheets.
- B. Instructions: Drawings, and Operation Information: Two copies of complete instructions shall be supplied to Owner prior to final acceptance. Material shall be in booklet form and shall consist of operating and maintenance manuals, parts manuals, dimensional drawings, unit wiring diagrams and schematics, interconnection wiring diagrams, and schematics, interconnection wiring diagrams, and necessary information for proper operation, service, and maintenance of the equipment and major components supplied.
- C. Owner Orientation: A representative of the supplier shall meet with a representative of the Owner at the time of final acceptance tests and shall review the operation and parts books, correct starting and control methods, and recommended preventive maintenance procedures.
- D. Recommended Spare Parts:
 - 1. Deliver with equipment. Each part to be packaged for shipment and marked for identification. Include part number and equipment identification for which it is intended for.

3.2 FIELD TESTS AFTER INSTALLATION

- A. The complete installation shall be initially started and checked out for operational compliance by factory- trained representative of the manufacturer of the generator set and the automatic transfer switch. The engine lubrication oil and antifreeze, as recommended by the manufacturer for operation under environmental conditions specified, shall be provided by the supplier of the generator set. If transfer switches and generator sets are furnished by different manufacturers, technical representatives of both transfer switch and generator set manufacturers shall be present during the field tests to verify operational compliance.
- B. Upon completion of initial start-up and system checkout, the supplier of the generator set shall perform a field test, with the Engineer notified in advance, to demonstrate load carrying capability, stability, voltage, and frequency.
- C. The generator set shall be run for six hours continuously connected via "Load bank". Records shall be maintained throughout this period to record water, temperature, oil pressure, ambient air temperature, voltage, current, frequency, kilowatts, and power factor. The above data shall be recorded at 15 minute intervals throughout the test.

There shall be a 10 minute intervals throughout conclusion of the test to allow engine to cool before shutdown. Three copies of the field test data shall be furnished to the engineer. The Contractor shall make all necessary hook-ups to accomplish field tests and shall furnish all fuel necessary for field test and start up.

- D. Simulated power failure test - generator set shall be made ready for automatic operation and started by means of the test transfer switch on the automatic transfer switch. Unit shall run for the duration of all time delays and then automatically shut down.
- E. Generator testing shall comply with the requirement of CEC 701.3 (A) through (E).

3.3 SPECIAL TOOLS

- A. Any special tools required for installation, adjustment or maintenance of the equipment shall be furnished with the equipment and their cost included in the price quoted.

END OF SECTION

SECTION 265100 - LIGHTING

PART 1 – GENERAL

1.1 Description of Work:

- A. The work of this section consists of providing a lighting system complete, including fixtures, lamps, hangers, reflectors, glassware, lenses, auxiliary equipment, ballasts and sockets.

1.2 Related Work:

- A. See the following specification sections for work related to the work of this section:

1. 260500 General Electrical Requirements.
2. 260542 Conduit, Raceway and Fittings.
3. 260519 Line Voltage Wire and Cable.
4. 260533 Outlet, Junction and Pull Boxes.

1.3 Submittals: In accordance with Division 01.

- A. Submit descriptive data, photometric curves for each fixture configuration proposed.
- B. Submit shop drawings showing proposed methods for mounting lighting fixtures.
- C. Seismic Requirements: Submit:
 1. Sketch or description of the anchorage system.
- D. Submit Operation and Maintenance Data per Division 01.

1.4 Warranty: High Intensity Discharge lamps which fail within the first year after final acceptance shall be replaced by the Contractor with the warranty clause of the General Provisions.

PART 2 – PRODUCTS

2.1 Fixtures

- A. Fixtures shall be of the types, wattage's and voltages shown on the Drawings and be UL classified and labeled for the intended use.
- B. Substitutions will not be considered unless the photometric distribution curve indicates the proposed fixture is equal to or exceeds the specified luminaire.

- C. Luminaire wire, and the current carrying capacity thereof shall be in accordance with the CEC.
- D. Luminaires and lighting equipment shall be delivered to the project site complete, with suspension accessories, aircraft cable, stems, canopies, hickeyes, castings, sockets, holders, ballasts, diffusers, frames, and related items, including support and braces.

2.2 Ballasts:

- A. Ballasts shall be of the types shown on the drawings. Ballasts shall be CBM certified and bear the UL label. Magnetic ballasts shall be the high power factor type. Electronic ballasts shall be suitable for lamps specified by Advance, Magnetek/Universal, Motorola or approved equal. Electronic ballast shall be CBM certified and have a 10% maximum total harmonic distortion.
- B. All ballasts for fixtures installed outdoors shall provide reliable starting of lamps at 0°F at 90% of the nominal line voltage.
- C. Ballasts producing excessive noise (above 36 dB) or vibration will be rejected and shall be replaced at no expense to the Owner.

2.3 Lamps:

- A. Lamps shall be new at the time of acceptance and shall be General Electric, Osram /Sylvania, Phillips, or approved equal.
- B. Unless otherwise noted on the drawings, lamps shall be third generation T8, 3500°K, and 85 CRI minimum.
 - 1. Third Generation: Also known as High-Performance, Higher Lumen, or Super, the third generation of 32 Watt T8 lamps offers 3,100 lumens and a long-life rating of 24,000 hours. Efficacy is high, with lumens per watt in the range of 94 to 100. CRI is 82 to 86.

PART 3 – EXECUTION

3.1 Installation:

A. General:

- 1. All fixtures and luminaires shall be clean and lamps shall be operable at the time of acceptance.
- 2. Install luminaires in accordance with manufacturer's instructions, complete with lamps, ready for operation as indicated.
- 3. Align, mount, and level the luminaires uniformly.

4. Avoid interference with and provide clearance for equipment. Where an indicated position conflicts with equipment locations, change the location of the luminaire by the minimum distance necessary.

B. Mounting and Supports:

1. Mounting heights shall be as shown on the Drawings. Unless otherwise shown, mounting height shall be measured to the centerline of the outlet box for wall mounted fixtures and to the bottom of the fixture for suspended fixtures and to the bottom of the fixture for all other types.
2. Luminaire supports shall be anchored to structural members.
3. Pendant stem mounted luminaires shall be provided with ball aligners to assure a plumb installation and shall have a minimum 45 degree clean swing from horizontal in all directions. Sway bracing shall be installed as required to limit the movement of the fixture. Fixtures shall be allowed to sway a maximum of 45° without striking any object.
4. Fixture supports shall be designed to resist earthquake forces of seismic zone 4.
5. Refer to fixture mounting details on drawings for installation requirements.
6. Pendant cable mounted luminaries shall be provided with fully adjustable stainless steel aircraft cable hangers unless otherwise noted on the Drawings.

END OF SECTION

**Division 31:
Earthwork**

SECTION 31 10 00 - SITE CLEARING

1.0 GENERAL

1.1 DESCRIPTION

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.

1.2 SECTION INCLUDES

- A. Remove of trees and other surface debris.
- B. Clear site of plant life and grass, grubbing.
- C. Protection of existing trees.
- D. Topsoil stripping.
- E. Removing above-grade improvements.
- F. Removing below-grade improvements.

1.3 RELATED SECTIONS

- A. Section 312213 - Rough Grading.
- B. Section 312316 – Excavation.
- C. Section 312316

1.4 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Not Used.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable code for disposal of debris, burning debris on site, use of herbicides and Conditions of Approval.
- B. Coordinate clearing Work with utility companies.

1.6 PROJECT CONDITIONS

- A. Traffic: Conduct site clearing operations to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities, unless otherwise noted, without permission from authorities having jurisdiction.
- B. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.
 - 1. Protect improvements on adjoining properties and on Owner's property.
 - 2. Restore damaged improvements to their original condition, as acceptable to property owners.
- C. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.
 - 1. Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.
 - 2. Provide protection of roots over 1-1/2 inch diameters that are cut during construction operations. Coat cut faces with emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible
 - 3. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Architect. Employ a licensed arborist to repair damages to trees and shrubs.
 - 4. Replace trees which cannot be repaired and restored to full-growth status, as determined by arborist.
- D. Improvements on Adjoining Property: Authority for performing removal and alteration work on property adjoining Owner's property will be obtained by Owner prior to award of contract.
 - 1. Extent of work on adjacent property is as indicated on Drawings.

- E. Salvageable Improvements: Carefully remove items indicated to be salvaged (to remain property of Owner), and store on Owner's premises where indicated or directed.

2.0 PRODUCTS

2.1 MATERIALS

- A. Not Used.

3.0 EXECUTION

3.1 SITE CLEARING

- A. General: Remove trees, shrubs, grass and other vegetation, improvements, or obstructions as required to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. "Removal" includes digging out and off-site disposing of stumps and roots or other material.
 - 1. Remove curbs, gutter, and sidewalks as indicated on civil drawings.
 - 2. Clear areas required for access to site and execution of Work.
- B. Topsoil: Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones and other objects over 2 inches in diameter, and without weeds, roots and other objectionable material.
 - 1. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.
 - 2. Stockpile suitable topsoil in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles, if required, to prevent wind erosion.
 - 3. Dispose of unsuitable or excess topsoil same as specified for disposal of waste material, or use for fill if approved by Architect or Soils Engineer.
- C. Clearing and Grubbing: Clear site of trees, shrubs and other vegetation, except for those indicated to be left standing.
 - 1. Completely remove stumps, roots, and other debris protruding through ground surface or as directed by Geotechnical Engineer.
 - 2. Use only hand methods for grubbing inside drip line of trees indicated to remain.

3. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
- D. Removal of Improvements: Remove existing above-grade and below-grade debris as indicated and as necessary to facilitate new construction.
1. Abandonment or removal of certain underground pipe or conduits may be indicated on civil, plumbing, mechanical or electrical drawings. Removal of abandoned underground piping or conduit is included under this Section.
 2. Back-filling of underground trenches resulting from removal of piping or conduits shall be completed as follows per specification section 312333 Backfill.

3.2 PROTECTION

- A. Locate, identify, and protect utilities that remain, from damage. Contractor will be responsible for any damage to existing utilities or improvements.
- B. Protect trees, plant growth, and features designated to remain, as final landscaping.
- C. Protect bench marks and existing structures from damage or displacement.

3.3 REMOVAL AND DISPOSAL OF WASTE MATERIALS

- A. Remove waste materials and unsuitable or excess topsoil from Owner's property, except as otherwise noted.
- B. Burning on Owner's Property: Burning is not permitted on Owner's property.

END OF SECTION

SECTION 31 22 13 - ROUGH GRADING

1.0 GENERAL

1.1 SECTION INCLUDES

- A. Removal of topsoil and subsoil.
- B. Cutting, grading, filling and rough contouring the site for site structures, building pads and landscaping.

1.2 RELATED SECTIONS

- A. Pacific Geotechnical Engineering, Geotechnical report dated Nov. 30, 2001
- B. Section 01 45 23 - Quality Control: Testing fill compaction.
- C. Section 31 10 00 - Site Clearing.
- D. Section 31 23 16 - Excavating: Building excavation.
- E. Section 31 23 33.13 - Backfilling: General building area backfilling.

1.3 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Not Used.

1.4 REFERENCES

- A. Refer to Civil Drawing and Geotechnical report.

1.5 PROJECT RECORD DOCUMENTS

- A. Not Used.

2.0 PRODUCTS

2.1 MATERIALS

- A. Not Used.

3.0 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions under provisions of Section 01039.

- B. Verify that survey bench mark and intended elevations for the Work are as indicated.
- C. It shall be the Contractor's responsibility to verify the quantity of cuts and fill. Any excess or shortage will be the Contractor's responsibility and no extra compensation will be due.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect utilities that remain, from damage.
- D. Notify utility company to remove and relocate utilities.
- E. Protect above and below grade utilities that remain.
- F. Protect plant life, lawns, and other features remaining as a portion of final landscaping.
- G. Protect bench marks, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 SUBSOIL EXCAVATION

- A. Excavate subsoil from areas to be further excavated, re-landscaped, or re-graded.
- B. Stockpile in area designated on site to depth not exceeding 8 feet. Protect from erosion. Remove subsoil not being reused, from site.
- C. Do not excavate wet subsoil.
- D. When excavating through roots, perform work by hand and cut roots with sharp axe.

3.4 FILLING

- A. Fill areas to contours and elevations with material recommended in Geotechnical report.
- B. Make grade changes gradual. Blend slope into level areas.
- C. Remove surplus fill materials from site.

- D. Where compacted building pad projects more than 3 feet from building face, remove and replace compacted material to a minimum 18 inches depth with approved planting soil. If the building pad is lime treated, remove lime treated pad full depth where it occurs more than 3 feet from building face.
- E. Place fill materials on continuous layers and compact in accordance with Civil Drawings and Geotechnical report.
- F. Maintain optimum moisture content of fill materials to attain required compaction density. To be supervised and approved by the Geotechnical Engineer.
- G. Slope grade away from building minimum 1/4 inches in 1 ft., unless noted otherwise.

3.5 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 1/10 foot.

3.6 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 45 23.
- B. Compaction testing will be performed in accordance with ANSI/ASTM D1557.
- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.
- D. Frequency of Tests: As directed by Architect/Engineer.

END OF SECTION

SECTION 31 23 16 - EXCAVATION

1.0 GENERAL

1.1 SECTION INCLUDES

- A. Excavating for building foundations.
- B. Excavating for slabs-on-grade, paving and landscaping.
- C. Excavating for site structures.

1.2 RELATED SECTIONS

- A. Geotechnical report.
- B. Section 01 45 23 - Quality Control: Inspection of bearing surfaces.
- C. Section 01 50 00 - Construction Facilities and Temporary Controls: Dewatering excavations and water control.
- D. Section 31 22 13 - Rough Grading: Topsoil and subsoil removal from site surface.
- E. Section 31 23 33.13 - Backfilling.

1.3 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Not Used.

1.4 FIELD MEASUREMENTS

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.

2.0 PRODUCTS

- A. Not Used.

3.0 EXECUTION

3.1 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Locate, identify, and protect utilities that remain, from damage.

- C. Notify utility company to remove and relocate utilities.
- D. Protect plant life, lawns and other features remaining as a portion of final landscaping.
- E. Protect bench marks, sidewalks, paving, and curbs from excavation equipment and vehicular traffic.

3.2 EXCAVATION

- A. Excavate subsoil required to accommodate building foundations, slabs-on-grade, paving and construction operations.
- B. Do not interfere with bearing splay of foundation as indicated in Geotechnical report.
- C. Grade top perimeter of excavation to prevent surface water from draining into excavation.
- D. Hand trim excavation. Remove loose matter.
- E. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd. measured by volume.
- F. Notify Architect/Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- G. Correct areas over-excavated in accordance with Section 31 23 33.13.
- H. Stockpile excavated material in area designated on site and remove excess material not being reused, from site.

3.3 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01400.
- B. Provide for visual inspection of bearing surfaces.

3.04 PROTECTION

- A. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation.

END OF SECTION

SECTION 31 23 16.13 - TRENCHING

1.0 GENERAL

1.01 SECTION INCLUDES

- A. Excavating trenches for utilities from 5 feet (1.5 m) outside building to municipal utilities.
- B. Compacted fill from top of utility bedding to subgrade elevations.
- C. Backfilling and compaction.

1.2 RELATED SECTIONS

- A. Section 01 45 23 - Quality Control: Testing fill compaction.
- B. Section 01 20 00 - Construction Facilities and Temporary Controls: Water control in excavations.
- C. Section 31 22 13 - Rough Grading: Topsoil and subsoil removal from site surface.
- D. Section 31 23 16 - Excavating: General building excavation.
- E. Section 31 23 33.13 - Backfilling: General backfilling.
- F. Section 03 30 00 - Cast-in-Place Concrete: Concrete materials.

1.3 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Not Used.

1.4 REFERENCES

- A. Refer to Geotechnical report.
- B. City Standards.

1.5 DEFINITIONS

- A. Utility: Any buried pipe, conduit, or cable.

1.6 FIELD MEASUREMENTS

- A. Verify that survey bench mark and intended elevations for the Work are as shown on drawings.

1.7 COORDINATION

- A. Coordinate work under provisions of Section 01039.
- B. Verify work associated with lower elevation utilities are complete before placing higher elevation utilities.

2.0 PRODUCTS

2.1 FILL MATERIALS

- A. Per Geotechnical report.

2.2 ACCESSORIES

- A. Geotextile Fabric: Per Geotechnical report.
- B. Filter Fabric: Per Geotechnical report.

3.0 EXECUTION

3.1 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Protect plant life, lawns, and other features remaining as a portion of final landscaping.
- C. Protect bench marks, existing structures, fences, sidewalks, paving, and curbs from excavation equipment and vehicular traffic.
- D. Maintain and protect above and below grade utilities which are to remain.
- E. Cut out soft areas of subgrade not capable of in situ compaction. Backfill with fill per Geotechnical report and compact to density equal to or greater than requirements for subsequent backfill material.

3.2 EXCAVATION

- A. Excavate subsoil required for utilities to municipal utilities.
- B. Cut trenches sufficiently wide to enable installation and allow inspection.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

- E. Remove lumped subsoil, boulders, and rock up to 1/3 cu yd. (0.25 cu m), measured by volume.
- F. Correct areas over excavated in accordance with Section 31 23 16.
- G. Stockpile excavated material in area designated on site and remove excess material not being used, from site.

3.3 BACKFILLING

- A. Backfill trenches to contours and elevations with materials recommended in Soil Report and City Standards.
- B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- C. Place geotextile fabric as recommended by Geotechnical report, prior to placing next lift of fill.
- D. Granular Fill: Place and compact materials in continuous layers not exceeding 6 inches (150 mm) compacted depth.
- E. Soil Fill: Place and compact material in continuous layers not exceeding 8 inches (200 mm) compacted depth.
- F. Employ a placement method that does not disturb or damage foundation perimeter drainage, conduit, duct in trench.
- G. Maintain optimum moisture content of fill materials to attain required compaction density.
- H. Remove surplus fill materials from site.
- I. Leave fill material stockpile areas completely free of excess fill materials.

3.4 TOLERANCES

- A. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch (25 mm) from required elevations.
- B. Top Surface of General Backfilling: Plus or minus 1 inch (25 mm) from required elevations.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 45 23.
- B. Compaction testing will be performed in accordance with Geotechnical report.

- C. If tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest.
- D. Frequency of Tests: Per Soils Engineer.

3.6 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 01 50 00.
- B. Reshape and re-compact fills subjected to vehicular traffic during construction.

END OF SECTION

SECTION 31 23 33 - BACKFILL

1.0 GENERAL

1.1 SECTION INCLUDES

- A. Building perimeter and site structure backfilling to subgrade elevations.
- B. Site filling and backfilling.
- C. Fill under slabs-on-grade, paving.
- D. Consolidation and compaction as scheduled.
- E. Fill for over-excavation.

1.2 RELATED SECTIONS

- A. Geotechnical report.
- B. Section 01 45 23 - Quality Control.
- C. Section 31 23 16 - Excavating.
- D. Section 03 30 00 - Cast-in-Place Concrete: Concrete materials.

1.3 REFERENCES

- A. Refer to Civil Drawings and Geotechnical report.

2.0 PRODUCTS

2.1 FILL MATERIALS

- A. Refer to Civil Drawings and Geotechnical report.

2.2 ACCESSORIES

- A. Vapor Retardant: 6 mil thick, polyethylene.

3.0 EXECUTION

3.1 EXAMINATION

- A. Verify subdrainage, dampproofing or waterproofing installation has been inspected.

3.2 PREPARATION

- A. Compact subgrade to density requirements for subsequent backfill materials.
- B. Cut out soft areas of subgrade not capable of in situ compaction. Backfill with fill and compact to density equal to or greater than requirements for subsequent fill material, per Geotechnical report.
- C. Scarify and proof roll subgrade surface to a depth of 12 inch to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

3.3 BACKFILLING

- A. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.
- B. Employ a placement method that does not disturb or damage other work.
- C. Maintain optimum moisture content of backfill materials to attain required compaction density.
- D. Slope grade away from building minimum 1/4 inches in 1 ft., unless noted otherwise.
- E. Make gradual grade changes. Blend slope into level areas.
- F. Remove surplus backfill materials from site.
- G. Leave fill material stockpile areas free of excess fill materials.

3.4 TOLERANCES

- A. Top Surface of Backfilling: Plus or minus 1 inch from required elevations.
- B. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.5 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 45 23.
- B. Compaction testing will be performed in accordance with Geotechnical report.
- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.

- D. Frequency of Tests: As directed by Soils engineer.
- E. Proof roll compacted fill surfaces under slabs-on-grade and paving.

3.6 PROTECTION OF FINISHED WORK

- A. Protect finished Work under provisions of Section 01 50 00.
- B. Reshape and re-compact fills subjected to vehicular traffic.

END OF SECTION

**Division 32:
Exterior
Improvements**

SECTION 321100 - SUBGRADE PREPARATION & BASE MATERIAL

1.0 GENERAL

1.1 DESCRIPTION

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide subgrade preparation and the base material installation complete, including clearing, grading, excavation, and filling and watering.

1.2 QUALITY ASSURANCE

- A. Reference Standards
 - 1. Perform all work in accordance with all applicable laws, codes and regulations required by the City of Salinas.
 - 2. Reference to "Standard Specifications" shall mean the Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, CALTRANS.
- B. Related work specified elsewhere includes:
 - 1. Section 32 13 13, Landscape Concrete 2 Section 32 80 00, Irrigation
- C. Stipulations
 - 1. The finished surface of the subgrade, at any point, shall not vary more than 0.05' above or below the elevation indicated on the drawings.
- D. ASTM Standards.

1.3 SOILS REPORT

- A. A soil investigation report has not been prepared for the project.

2.0 MATERIALS

2.1 AGGREGATED BASE - CLASS 2

- A. Aggregate base shall be Class 2, and free from vegetable matter or other deleterious substances. The percentage composition by weight of aggregate base shall conform to Section 26 of the Standard Specifications.

2.2 RECYCLED AGGREGATE BASE - CLASS 2

- A. Subject to the approval of the Geotechnical testing Engineer, recycled aggregate base shall be Class 2, and free from vegetable matter or other deleterious substances. The percentage composition by weight of aggregate base shall conform to Section 26 of the Standard Specifications. Existing material may be reused if it meets the specifications for Aggregate Base -Class 2 and the required compaction and the approval of the Geotechnical Engineer.

3.0 EXECUTION

3.1 TOPSOIL STRIPPING

- A. Limit to areas required by the need to prepare subgrade for improvements shown on material plans and grading plans and soil preparation plans including: paving, foundations, ramps, building pads and special soils required on the plans. Strip topsoil to required depths in a manner to prevent intermingling with underlying subsoil or other waste materials.
- B. Remove heavy growths of grass from areas before stripping. Remove trash, debris, weeds, roots, and other waste materials.
- C. Refer to Section 32 90 00 Planting and drawings for areas to receive Planting Soil Preparation.
- D. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust. Locate stockpiles where approved by Construction Manager.

3.2 SUBGRADE PREPARATION

- A. Refer to drawings for Fill Placement and Compaction.
- B. Subgrade is that area on which pavement, surfacing, base, sub-base or layer of any other material which may be specified is to be placed.
- C. Scarify subgrade to a depth of at least 12" below the final subgrade elevation, harrow, dry roll and break clods to achieve a finely divided condition. Remove all boulders, hardened material or rock encountered. The earth shall be uniform for the full depth and width of the subgrade.
- D. Water the loose earth in a uniform manner and quantity so that the penetration will be at least 4".
- E. Harrow the earth to mix the wet earth with the dry beneath, until the whole mass of loose material is at the proper state of moisture for compaction.
- F. The finished subgrade, immediately prior to placing subsequent material thereon, shall be in accordance with the Standard Specifications for Class 2 Aggregate Base.
- G. Compact Engineered Fill to at least 95 percent relative compaction as determined by ASTM Test Designation D1557.

- H. Compact Subgrade below Class 2 Aggregate Base to at least 95 percent relative compaction as determined by ASTM Test Designation D1557.

3.3 AGGREGATE BASE

- A. Deliver to site as a uniform mixture and spread each layer in one operation without segregation.
- B. Class II Aggregate Base shall be readily compacted and spread with equipment that will provide a uniform layer conforming to the planned section, and as specified in Section 26 of the Standard Specifications.
- C. Compact the Class 2 Aggregate base to at least 95 percent relative compaction as determined by ASTM Test Designation D1557.

3.4 CLEANUP

- A. Refer to Section 017400 Construction Cleaning & Waste Management.

END OF SECTION 321100

SECTION 32 12 16 - ASPHALT PAVING

1.0 GENERAL

1.1 SECTION INCLUDES

- A. Asphaltic concrete paving and surface sealer; wearing binder or base course.
- B. Aggregate base course.

1.2 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

- A. Section 05500 - Metal Fabrications: Supply of gutter drainage grilles and frames for placement by this Section.

1.3 RELATED SECTIONS

- A. Section 31 22 13 - Rough Grading: Preparation of site for paving and base.
- B. Section 31 23 33.13 - Backfilling: Compacted subbase for paving.
- C. Section 09900 - Painting: Pavement markings.

1.4 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Not Used.

1.5 REFERENCES

- A. City Public Work's Design stds. and std. Details (section 1).
- B. State of California Department of Transportation, Standard Specifications, latest edition.

1.6 PERFORMANCE REQUIREMENTS

- A. Paving: Designed for parking and related traffic. Verify other requirements in conformance with other applicable standards.

1.7 QUALITY ASSURANCE

- A. Perform Work in accordance with California Department of Transportation Standard specifications.
- B. Mixing Plant: Conform to Public Work's standard.

C. Obtain materials from same source throughout.

D. Maintain one copy of each document on site.

1.8 REGULATORY REQUIREMENTS

A. Conform to applicable code for paving work on public property.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Do not place asphalt when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

2.0 PRODUCTS

2.1 MATERIALS

A. Asphalt Cement: ASTM D946 In accordance with Public Work's standards.

B. Aggregate for Binder Course Mix: In accordance with Public Work's standards.

C. Aggregate for Wearing Course Mix: In accordance with Public Work's standards.

D. Fine Aggregate: In accordance with Public Work's standards.

E. Mineral Filler: Finely ground particles of limestone, hydrated lime or other Mineral dust, free of foreign matter.

2.2 ACCESSORIES

A. Primer: In accordance with Public Work's standards.

B. Tack Coat: In accordance with Public Work's standards.

2.3 ASPHALT PAVING MIX

A. Use dry material to avoid foaming. Mix uniformly per Public Work's standards.

2.4 SOURCE QUALITY CONTROL

A. Not Used.

3.0 EXECUTION

3.1 EXAMINATION

A. Verify base conditions under provisions of Section 01039.

- B. Verify that compacted subgrade is dry and ready to support paving and imposed loads.
- C. Verify gradients and elevations of base are correct.

3.2 SUBBASE

- A. Aggregate Base Course forms the base construction for work of this Section. Refer to Civil Drawings.

3.3 PREPARATION – PRIMER

- A. Apply primer in accordance with Public Work's standards.
- B. Apply primer to contact surfaces or curbs, gutters and driveways.
- C. Use clean sand to blot excess primer.

3.4 PREPARATION - TACK COAT

- A. Apply tack coat in accordance with Public Work's standards.
- B. Apply tack coat to contact surfaces of curbs, gutters and driveways.

3.5 PLACING ASPHALT PAVEMENT - SINGLE COURSE

- A. Install Work in accordance with Public Work's standards.
- B. Place asphalt within 24 hours of applying primer or tack coat.
- C. Place to thickness identified on drawings.
- D. Install catch basins, frames and curb inlet in correct position and elevation.
- E. Compact pavement by rolling. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.
- F. Develop rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.6 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.
- B. Scheduled Compacted Thickness: Within 1/4 inch.
- C. Variation from True Elevation: Within 1/2 inch.

3.7 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01400.

3.8 PROTECTION

- A. Immediately after placement, protect pavement from mechanical injury for 5 days.

END OF SECTION

SECTION 321313 - LANDSCAPE CONCRETE

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install concrete sidewalks, integral curbs, gutters, parking areas, driveways, and roads; and aggregate base course.
- D. Includes integrally colored finishes for site-cast concrete.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 033000 – Cast-In-Place Concrete
- C. Section 312213 - Rough Grading
- D. Section 312333 - Backfill
- E. Section 321100 - Subgrade Preparation & Base Material
- F. Section 329000 - Planting: Landscape Work

1.3 REFERENCES

- A. ACI 304 (American Concrete Institute) Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
- B. ASTM C 979 Pigments for Integrally Colored Concrete and ACI 301 for performance of work with Integrally Colored Concrete Admixtures.
- C. ASTM A185 Welded Steel Wire Fabric for Concrete Reinforcement.
- D. ASTM A497 Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
- E. ASTM A615 Deformed and Plain Billet Steel for Concrete Reinforcement.

- F. ASTM C33 Concrete Aggregates.
- G. ASTM C94 Ready Mix Concrete.
- H. ASTM C150 Portland Cement
- I. ASTM C260 Air Entraining Admixtures for Concrete.
- J. ASTM C309 Liquid Membrane Forming Compounds for Curing Concrete.
- K. ASTM C494 Chemical Admixtures for Concrete.
- L. ASTM D1751 Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
- M. ASTM D1752 Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- N. City Design Standards and standard details for construction.

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with requirements of Local Municipality.
- B. Maintain one copy of each document on site.
- C. Obtain cementitious materials from same source throughout.
- D. Work shall conform per California Building Code (CBC), 2016 Edition, Section 11B-402.
- E. Conduct conference at site to review procedures required to produce specified results for integrally colored concrete.
- F. Installer Qualifications: Integrally colored concrete work shall be by firm with 5 years' experience with work of similar scope and quality.

1.5 ENVIRONMENTAL REQUIREMENTS

- A. Do not place concrete when base surface temperature is less than 40 degrees, or surface is wet or frozen.

1.6 SUBMITTALS

- A. Submit Samples of color additives and curing products for Architect's selection from full manufacturer's range.
 - 1. Samples for Verification: Submit three (3) sample chips of each selection of

concrete colors indicating manufacturer's name, color number and finish.

B. Shop Drawings: Indicate extent of each color of integrally colored concrete.

C. Integrally Color Concrete Mockup:

1. Provide full-scale mock-up 30 days before start of other concrete work, in location acceptable to Architect or Project Manager. Demonstrate methods used for construction, including forming and finishing conditions required for Project using materials, workmanship, joint treatments, and curing methods to be used for this work.

2. Mockup may remain part of Work if acceptable to Architect or Project Manager.

2.0 PRODUCTS

2.1 FORM MATERIALS

A. Conform to ACI 301.

B. Wood or Steel form material, profiled to suit conditions.

B. Joint Filler: ASTM D1751.

2.2 REINFORCEMENT

A. Reinforcing Steel: ASTM A615; deformed billet steel bars; unfinished.

B. Welded Steel Wire Fabric: Plain type, ASTM A185 in flat sheets or coiled rolls; unfinished.

C. Dowels: ASTM A615; plain steel, unfinished.

2.3 CONCRETE MATERIALS

A. Concrete Materials: As specified in Section 033000, Cast-In-Place Concrete and as provided in accordance with local municipality Public Work's standards.

2.4 CONCRETE MIX BY PERFORMANCE CRITERIA

A. Provide concrete to the following criteria:

1. Pavements and walks, Kennel pad: Compressive Strength: 2000 psi @ 28 days, 4 inches minimum thickness.

2. Trash Enclosure pad and apron: Compressive Strength: 4000 psi @ 28 days, 6

inches minimum thickness.

2.5 INTEGRAL CONCRETE ADDITIVES

- A. Cements, supplementary cementitious materials, fine aggregates, water shall be per concrete materials as stated in paragraph 2.3.
- B. Color Additives Manufacturers:
1. Davis Colors, 800-356-4848 or 323-269-7311, www.daviscolors.com/
 2. Or equal per Division 1 of these Contract Documents.
- C. Type: Method by either of the following:
1. Automated Dispensing: Meter and dispense colors using computer-controlled automated color weighing and dispensing system.
 2. Manual Dispensing: Mix-Ready powdered color additives in pre-measured disintegrating bags.
- D. Mixes:
1. Slump: 4 inches. If greater slump is required, use water-reducing or super-plasticizing admixture; do not add water.
 2. Color Additives: Mix in accordance with manufacturer's instructions. Mix until color additives are uniformly dispersed throughout mixture and disintegrating bags, if used, have disintegrated.
 3. Do not retemper mix or add water in field.
- E. Colors: As selected by Architect from manufacturer's full color range.

2.6 CONCRETE FLATWORK AT INTEGRALLY COLORED CONCRETE

- A. Curing Compound for Flatwork: Shall be of color cure and sealed to match integrally colored concrete; complying with ASTM C309 and designed for use on integrally colored concrete.

2.7 ACCESSORIES

- A. Joint Sealants shall be per Section 079000 Sealants and Caulking.

3.0 EXECUTION

3.1 EXAMINATION

- A. Verify compacted subgrade or granular base is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

3.2 SUBBASE

- A. Section 321100, Subgrade Preparation & Base Material forms the base construction for Work of this section.

3.3 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Coat surfaces of manhole and catch basin frames with oil to prevent bond with concrete pavement.
- C. Notify Architect/Engineer minimum 24 hours prior to commencement of concreting operations.

3.4 FORMING

- A. Form Materials: Conform to ACI 301.
- B. Place and secure forms to correct location, dimension, profile, and gradient.
- C. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- D. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.5 REINFORCEMENT

- A. Place reinforcement as indicated on drawings.
- B. Interrupt reinforcement at expansion joints.
- C. Place reinforcement to achieve pavement and curb alignment as detailed.

3.6 PLACING CONCRETE

- A. Place concrete in accordance with local municipality Public Work's standards.
- B. Ensure reinforcement, inserts, embedded parts, formed joints and are not disturbed during concrete placement.
- C. Place concrete continuously over the full width of the panel and between

predetermined construction joints.

- D. Place concrete to pattern indicated on drawings.
- E. Integrally Colored Concrete:
 - 1. Do not place integrally colored concrete where standing water is present.
 - 2. Install and construct per manufacturer's written recommendations.

3.7 JOINTS

- A. Refer to City Standards.
- B. Place expansion and contraction joints as shown on drawings. Align curb, gutter, and sidewalk joints.
- B. Place joint filler between paving components and building or other appurtenances. Recess top of filler 1/4 inch for sealant placement. Provide sealant.
- C. Provide scored sawn joints as indicated on drawings and between sidewalks and curbs.
- D. For Solar System provide 1/2 inch bronze dividers for orbit locations.

3.8 FINISHING

- A. Sidewalk Paving: Medium (non-slip) broom and trowel joint edges as indicated on Architectural drawings.
- B. Curbs and Gutters: Light broom.
- C. Direction of Texturing: Transverse to pavement direction.
- D. Inclined Pedestrian Ramps: Heavy sand-blast finish to path of travel.
- E. Place curing compound on exposed concrete surfaces immediately after finishing.
- F. Provide light broom in circular pattern for Solar system.

3.9 JOINT SEALING

- A. Separate pavement from vertical surfaces with thick joint filler.
- B. Place joint filler in pavement pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.
- C. Extend joint filler from bottom of pavement to within 1/8 inch of finished surface.

Conform to joint sealer manufacturer requirements.

3.10 TOLERANCES

- A. Maximum Variation of Surface Flatness: 1/4 inch in 10 feet.
- B. Maximum Variation from True Position: 1/2 inch.

3.11 FIELD QUALITY CONTROL

- A. Testing firm will take cylinders and perform slump [and air entrainment] tests in accordance with ACI 301.
- B. One slump test will be taken for each set of test cylinders taken.
- C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.12 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Do not permit pedestrian or vehicular traffic over pavement for 7days minimum after finishing.

3.13 CLEANING

- A. Efflorescence: Remove efflorescence as soon as practical after it appears and/or as part of final cleaning.
 - 1. Use least aggressive cleaning techniques possible.
 - 2. Do not use muriatic or hydrochloric acid on integrally colored concrete.

END OF SECTION

SECTION 321723 - PAVEMENT MARKINGS

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Parking lot pavement striping, accessible parking loading zone striping and parking symbol.

1.2 RELATED SECTIONS

- A. Section 099100 - Painting
- B. Section 101400 – Signage for pole-mounted parking and traffic control signs.
- C. Section 321216 – Asphalt Paving

1.3 REFERENCES

- A. American national Standards Institute (ANSI):
 - 1. ANSI A117.1: Standard on Accessible and Usable Buildings and Facilities.
- B. California Building Code (CBC) – California Code of Regulations, Title 24, Part 2.
- C. State of California Department of Transportation (Caltrans): Specification No. PTWB-01, Paint, Waterborne Traffic Line, White, Yellow and Black.
- D. Cod of Federal Regulations (CFR):
 - 1. 40 CFR, Part 59, Subpart D: National Volatile Organic Compound Emission Standards.
- E. Federal Standard 595B: Colors.
- F. United States Department of Justice:
 - 1. 2010 ADA Standards for Accessible Design.

1.4 DEFINITIONS

- A. VOC: Volatile Organic Compound.

1.5. SUBMITTALS

- A. Product Data: For each type of paint product indicated.
- B. Samples for Verification: For colors indicated.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Label each Sample for location and application area.

1.6 QUALIFY ASSURANCE

- A. Applicator Qualifications: A firm or individual experienced in applying pavement striping and markings similar in material, design and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Mockups: Build mockups to verify selections made under sample submittal and to demonstrate aesthetic effects and set quality standards for material and execution.
 - 1. Build mockups as follows:
 - a. Typical removal of existing striping and markings.
 - b. Typical parking stall striping.
 - c. Typical accessible stall striping.
 - 2. Obtain Architect's approval of mockups prior to starting pavement striping and marking.
 - 3. Approved mockups may become part of completed Work.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver, handle and store materials in accordance with manufacturer's instructions.
- B. Deliver items in manufacturer's original unopened protective packaging and containers bearing manufacturer's name and label with the following information:
 - 1. Product name or title of material.
 - 2. Product description, stock number, date of manufacture, color and number and VOC content.

3. Thinning instructions, application instructions.
- C. Store materials in tightly covered containers in a clean, dry, well-ventilated area within temperature range required by manufacturer. Maintain storage containers in clean condition, free of foreign materials and residue.
- D. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

- A. Proceed with pavement markings only on clean dry surfaces and at a minimum ambient or surface temperature of 50 deg F, and not exceeding 95 deg F, or within recommended ranges by paint manufacturer in writing.
- B. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent, or to damp or wet surfaces.

2.0 PRODUCTS

2.1 REGULATORY REQUIREMENTS

- A. Accessible Requirements: Pavement markings for parking stalls designated as accessible to be in compliance with applicable provisions of the following:
 1. CBC, Title 24, Part 2., Chapters 11A and 11B.
 2. United States Department of Justice's 2010 ADA Standards for Accessible Design.

2.2 PAVEMENT MARKING PAINT

- A. Latex, water-borne product, lead and chromate free, ready mixed, complying with Caltrans State Specification No. PTWB-01.
 1. VOC Content: No more than that allowed by local and federal regulations when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 2. Colors:
 - a. Parking stall striping and accessible parking symbols: White unless indicated otherwise.
 - b. Striping for Accessible parking stall access aisle: Blue (No. 15090 per Federal Standard 595B) at perimeter border and White at diagonal hatching.

- c. Accessible parking symbol: Blue (No. 15090 per Federal Standard 595B) at background and White at symbol.
3. Products: Subject to compliance with requirements, provide one of the following:
 - a. Dunn-Edwards Corporation; VIN-L-STRIPE Traffic Marking Paint W801.
 - b. Frazee Paint; 506 Traffic Paint.
 - c. Kelly-Moore Paints; 1450 Mark Right, Latex Marking Paint.
 - d. Equal product in accordance with Division 1 requirements for product substitution.

3.0 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas and conditions; with Applicator present, for compliance with requirements for paint application.
 1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
 2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.

3.2 PREPARATION

- A. Allow paving to cure for a minimum time period of 45 days prior to start of pavement striping and marking, or for minimum time period as recommended in writing by the traffic paint manufacturer, whichever is more.
- B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the coatings. Remove dirt, grease, and other foreign matter.
- C. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

3.3 APPLICATION

- A. General: Apply pavement marking paint according to manufacturer's written instructions.

1. Apply pavement marking paint with atomizing spray type striping machine equipped with separate thermostatically controlled heating devices for each paint pot and capable of applying paint such that lines and markings have uniform straight edges, true and smooth alignment and uniform thickness.
2. Apply graphic symbols and lettering with paint resistant, die-cut stencils, firmly secured to concrete surface. Mask an extended area beyond edges to prevent paint beyond stencil. Apply paint so as not to run beneath stencil.

B. Pavement Markings:

1. Stripe and mark parking stalls and accessible aisles and other markings as shown on Drawings.
 - a. Width of Parking Stall Striping: 4 inches.
 - b. Width of Striping at Accessible Access Aisle: 4 inches.
 - i. Paint words "NO PARKING" in 12-inch high letters (color: White) at foot of access aisle.
 - c. International Symbol of Accessibility: Center symbol in stall facing outwards, with lower edge of symbol aligned with end of parking stall, as indicated on Drawings.

3.4 CLEANING

- A. At completion of pavement striping and marking, and curb painting, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
 1. After completing painting, clean adjacent paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging surfaces.

3.5 PROTECTION

- A. Exercise reasonable precautions to protect the paint, as applied, during drying time. Remove objectionable tracking and marks.

END OF SECTION

SECTION 321726 – TACTILE WARNING SURFACES

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Tactile warning surface panels with cast-in-place truncated domes for horizontal pedestrian traffic areas.

1.2 RELATED SECTIONS

- A. Section 321313 – Landscape Concrete

1.3 REFERENCES

- A. ASTM International (American Society for Testing and Materials):
 - 1. ASTM B117: Standard Practice for Operating Salt Spray (Fog) Apparatus.
 - 2. ASTM C 501: Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by Taber Abraser.
 - 3. ASTM C 1028: Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
 - 4. ASTM D 570: Standard Test Method for Water Absorption of Plastics.
 - 5. ASTM D 638: Standard Test Method for Tensile Properties of Plastics.
 - 6. ASTM D 695: Standard Test Method Compressive Properties of Rigid Plastics.
 - 7. ASTM D790: Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
 - 8. ASTM E 84: Standard Test Method for Surface Burning Characteristics of Building Materials.

9. ASTM G 26: Standard Practice for Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials.

B. California Building Code (CBC) – California Code of Regulations, Title 24, Part 2.

C. United States Department of Justice:

1. 2010 ADA Standards for Accessible Design.

1.4 COORDINATION

A. Coordinate installation of cast-in-place tactile warning surface panels with placement of site concrete per Section 321313 Landscape Concrete.

B. Verify concrete slump range is within limit as recommended in writing by manufacturer of tactile warning surface cast-in-place panels.

1.5 SUBMITTALS

A. Product Data: For each type of paint product indicated. Include technical data and tested physical and performance properties.

B. Shop Drawings: Show layout and placement of tactile warning surface panel joints and fasteners.

C. Samples for Verification: 6 inch by 6 inch sample, for each color and type of tactile warning surface.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: Provide tactile warning surfaces to be included in maintenance manuals. Include manufacturer's written cleaning instructions.

1.7 QUALIFY ASSURANCE

A. Manufacturer Qualifications: A firm experienced in manufacturing tactile warning surface and with a record of successful in-service performance.

B. Installer Qualifications: A qualified installer who employs workers for this Project that are trained and approved by manufacturer.

C. Fire-Test-Response Characteristics: Provide products identical to those tested for fire-exposure behavior per test method indicated by testing and inspecting agency acceptable to authorities having jurisdiction.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver, handle and store materials in accordance with manufacturer's instructions.

B. Store panels on flat surfaces.

1.7 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when substrate temperature and ambient temperature, and existing forecasted weather conditions permit installation of tactile warning surfaces to be performed according to manufacturer's written instructions and warranty requirements.

B. Close area to traffic for 48 hours after tactile warning surface installation.

2.0 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessible Requirements: Comply with requirements for tactile warning surfaces per the following:

1. CBC, Title 24, Part 2., Chapters 11A and 11B.

2. United States Department of Justice's 2010 ADA Standards for Accessible Design.

2.2 TACTILE WARNING SURFACES - GENERAL

A. General: Manufacturer's detectable warning system consisting of prefabricated panels with raised truncated dome pattern and non-slip surface area to provide warning and directional assistance to visually impaired pedestrians.

B. Truncated Dome Profile Dimensions:

1. Base Diameter: 0.9 inch.

2. Diameter at Top of Dome: 0.45 inch.

3. Dome Height: 0.2 inch.

4. Dome Pattern: In-line square pattern.

i. Dome Spacing: laid on the square, 2.35 inches, center to center, both ways.

2.3 TACTILE WARNING SURFACES – CAST-IN-PLACE PANELS

- A. General: Manufacturer's prefabricated polymer or glass and carbon-reinforced composite panels with raised truncated dome pattern; designed for installation by casting embedment flanges with mechanical keyways on backside of panel into wet (e.g. uncured) concrete substrate; homogeneous color and pattern throughout thickness of material; waterproof and nonabsorbent; ultraviolet light-stable; approved by authority having jurisdiction.
 - 1. Available Manufacturers:
 - a. ADA Solutions, Inc.
 - b. Engineering Plastics, Inc.; Armor-Tile.
- B. Panel Dimensions: 24 inches by 36 inches, 24 inches x 48 inches, 24 inches by 60 inches, 36 inches by 48 inches, or 36 inches by 60 inches, as indicated on Drawings.
- C. Face Thickness 1/8 to 3/16 inches.
- D. Panel Depth (Including Embedment Flanges): 1-3/8 inches to 1-1/2 inches.
- E. Color: Yellow.
- F. Physical Properties:
 - 1. Slip Resistance: Not less than 0.80 static coefficient of friction for wet surfaces.
 - 2. Water Absorption: 0.13 percent maximum, per ASTM D 570.
 - 3. Compressive Strength: Not less than 23,800 psi, per ASTM D 695.
 - 4. Flame Spread: 15 or less, per ASTM E 84.
 - 5. Weathering: No change or deterioration at 3,000 hours of exposure, per ASTM G 26 or ASTM G 155.
 - 6. Salt and Spray Performance: No deterioration or other effects after 120 hours of exposure, per ASTM B 117.

3.0 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas and conditions; with Installer present, for compliance with requirements for tolerances, moisture content, and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of tactile warning surface panels.
- B. At areas to receive cast-in-place tactile warning panels, verify that substrates are dry and free of curing compounds, sealers, loose material, dust, oils, grease and other foreign materials that may affect installation.
- C. Prior to installation, clean backside of tactile warning panels as recommended by manufacturer's written instructions.

3.3 INSTALLATION - GENERAL

- A. General: Install tactile warning panels according to manufacturer's written instructions.
- B. Lay out tactile warning panels in sizes and configurations as shown on Drawings.
- C. If not indicated otherwise, layout panels from center marks established at end points, so panels at opposite ends of run are of equal width. Adjust as necessary to avoid using cut width and equal to less than one-half panel width at ends.
- D. Maintain alignment of truncated domes from panel to panel, set true and square to adjacent curbs, ramps, and paving edges.

3.4 INSTALLATION – CAST-IN-PLACE TACTILE WARNING SURFACE PANELS

- A. Refer to Section 321313 Landscape Concrete for placement and finishing of concrete paved substrate at areas to receive cast-in-place tactile warning surfaces.
- B. Verify proper lines and levels for setting of panels.
- C. Protect finish face of tactile warning panels from wet concrete with manufacturer's plastic sheeting or other means of protection.
- D. Place cast-in-place tactile warning panels into fresh concrete and tamp into place as required to eliminate all air voids below each panel, and fully encase all embedment flanges and keyway holes with concrete.

3.5 CLEANING

- A. Remove adhesive and other surface blemishes using cleaner recommended by tactile warning surface manufacturer.

- B. Clean tactile warning surfaces in accordance with manufacturer's written instructions.

3.6 PROTECTION

- A. Do not allow traffic on tactile warning surfaces until the following conditions have been met:
 - 1. Cast-in-place Panels: Underlying concrete has fully cured.
- B. Once conditions have been met for allowing traffic over tactile warning surfaces, do not move heavy or sharp objects directly over surfaces. Place plywood or hardboard sheets over tactile warning surfaces and under objects while objects are being moved. Slide or roll objects over protective sheets without moving sheets.

END OF SECTION

SECTION 323113 - CHAIN LINK FENCES AND GATES

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install Poly Vinyl Chloride (PVC) coated chain-link fencing, Poly Vinyl Chloride (PVC) coated chain link swing gates, and all related accessories as shown on project Drawings and as specified herein.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 085169 - Gate Hardware
- C. Section 321216 - Asphalt Paving
- D. Section 321313 - Portland Cement Concrete Paving
- E. Section 329000 - Planting: Landscape Work

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM F567 - Standard Practice for Installation of Chain-Link Fence
 - 2. ASTM F626 - Standard Specification for Fence Fittings
 - 3. ASTM F900 - Standard Specification for Industrial and Commercial Swing Gates
 - 4. ASTM F1043 - Standard Specification for Strength and Protective Coatings on Steel Industrial Chain Link Fence Framework
 - 5. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures
 - 6. ASTM A36 - Standard Specification for Carbon Structural Steel

7. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
8. ASTM B221 Standard Specification for Aluminum and Aluminum Alloy Bars, Rods, Wire Profiles and Tubes.
8. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric
9. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
10. ASTM A525 - Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
11. ASTM F668 Standard Specification for Polyvinyl Chloride (PPVC) and Other Organic Polymer-Coated Steel Chain Link Fence Fabric
12. ASTM A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-dip Galvanized Coatings
11. ASTM F1664 Standard Specification for Polyvinyl Chloride (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used With Chain Link Fence

1.4 SUBMITTALS

- A. Comply with provisions of the General Conditions, Submittal Procedures.
- B. Shop drawings: Layout of fences and gates with dimensions, details, and finishes of components, accessories, and post foundations.
- C. Product data: Manufacturer's catalog cuts indicating material compliance and specified options.
- D. Samples: Provide samples of materials, including wires and accessories.

1.5 QUALITY ASSURANCE

- A. Products from qualified manufacturers having a minimum of 5 years experience manufacturing galvanized chain link fencing and gates will be acceptable by the Architect as equal, if approved in writing, ten (10) days prior to bidding, and if they meet all of the following specifications for design, size gauge of metal parts and fabrication.
- B. Obtain chain link fences and gates, including accessories, fittings, and fastenings, from a single source.

2.0 PRODUCTS

2.1 MANUFACTURER

- A. Anchor Fence, 1015 East Market Street, Daly City, CA 94014, 1-650-757-2140, www.anchorfencecompany.com, Master Halco, 3040 S. Cedar Ave., Fresno, CA 93725, www.fenceonline.com, or approved equal.

2.2 CHIN LINK FENCE FABRIC

- A. Polyvinyl Chloride (PVC) color coated steel chain link fabric per ASTM F668 Class 2b.
- B. Size and Height: Chain ink fabric 2 in. mesh, 9 gauge steel core wire having a break load of 1290 lbf, height per plans.
- C. Selvage of fabric knuckle at top and knuckle at bottom.
- D. Color of chain link fabric per ASTM F934 Black.

2.3 STEEL FENCE FRAMING

- A. Steel Pipe:
1. Type I: ASTM F1083, standard weight schedule 40; minimum yield strength of 25,000 psi; sizes as indicated. Hot-dipped galvanized with minimum average 1.8 oz./ft.² of coated surface area on the inside and outside. Exterior of pipe to have F1043 PVC thermally fused color coating, minimum thickness 10 mils.
- B. Formed Steel ("C") Sections: Roll formed steel shapes complying with ASTM F1043, Group II, produced from 45,000 psi yield strength steel; sizes as indicated. External coating per ASTM F1043, Type A, minimum average 2.0 oz./ft.² of zinc per ASTM A123, or 4.0 oz./ft.² per ASTM A525 plus a minimum 10 mil thermally fused PVC color coating in accordance with F1043.
- C. Steel Square Sections: ASTM A500, Grade B Steel having minimum yield strength of 40,000 psi; sizes as indicated. Hot-dipped galvanized with minimum 1.8 oz./ft.² of coated surface area plus a minimum 10 mil thermally fused PVC color coating in accordance with F1043..
- D. End and Corner Post 2-5/8" od 3.65 lbs/ft.
OR
End and Corner Post 2-1/2 sq" 3.65 lbs/ft.
- E. Line (intermediate) Post 2-1/2" od 3.65 lbs/ft.

- F. Rail and Braces 1-3/8" od

2.4 CHAIN LINK SWING GATES

- A. Gate frames: Fabricate chain link swing gates in accordance with ASTM F900 using galvanized steel tubular members, 2" square, weighing 2.60 lb/ft Fusion or stainless steel welded connections forming rigid one-piece unit. Welded areas to be protected with zinc-rich paint per ASTM A780 then over coated with liquid PVC to match frame. PVC coated pipe to be Grade 1 per section 2.03. Chain link fabric to match specifications of fence system.
- B. For gates over 8' high or 15' wide, provide minimum 1-1/2" square additional horizontal and vertical interior members to ensure proper strength.
- C. Hardware materials: Hot dipped galvanized steel or malleable iron shapes to suit gate size.
- D. Hinges: Structurally capable of supporting gate leaf and allow opening and closing without binding. Non-lift-off type hinge design shall permit gate to swing 180° inward or 180° outward per plan. May be field coated with liquid PVC.
- E. Latch: Forked type capable of retaining gate in closed position and have provision for padlock. Latch shall permit operation from either side of gate. May be field coated with liquid PVC.
- F. Keeper: Provide keeper for each gate leaf over 5' wide. Gate keeper shall consist of mechanical device for securing free end of gate when in full open position.
- G. Gate posts: PVC color coated steel pipe ASTM F1083 standard weight schedule 40; minimum yield strength of 25,000 psi size as indicated. Hot-dipped galvanized with minimum 1.8 oz/ft² of zinc or respective material finished in accordance with ASTM F1043.

Gate Leaf Single Width	Post Size (round)	Weight
6 feet or less	2.875 inches	5.79 lb/ft
6 feet	4.00 inches	9.11 lb/ft
12 feet to 19 feet	6.625 inches	18.97 lb/ft
19 feet	8.625 inches	28.55 lb/ft
OR		
Gate Leaf Single Width	Post Size (square)	Weight
6 feet	2.5 inches	5.1 lb/ft
6 feet	4.0 inches	9.59 lb/ft
12 feet	6.0 inches	14.65 lb/ft
19 feet	8.0 inches	25.44 lb/ft

2.5 SETTING MATERIALS

- A. Concrete: Minimum 28 day compressive strength of 2,500 psi.

2.6 ACCESSORIES

- A. Provide items required to complete fence system. Galvanize each ferrous metal item and finish to match framing in accordance with ASTM F626.
- B. All accessories and fittings to be PVC thermally fused color coated having a minimum thickness of 0.006" per ASTM F626. PVC color to match fabric and framework. Moveable parts, nuts and bolts to be field coated with PVC liquid touch up after installation.
- C. Post Caps: Formed steel, cast malleable iron, or aluminum alloy weathertight closure cap for tubular posts. Provide one cap for each post. Cap to have provision for barbed wire when necessary. "C" shaped line post without top rail or barbed wire supporting arms do not require post caps. (Where top rail is used, provide tops to permit passage of top rail.)
- D. Top Rail And Brace Rail Ends: Pressed steel per ASTM F626, for connection of rail and brace to terminal posts.
- E. Top Rail Sleeves: 7" expansion sleeve with spring, allowing for expansion and contraction of top rail.
- F. Wire Ties: Double wrap 13 gauge for rails and braces. Tie wire PVC coated and in compliance with ASTM F626. Color to match fabric color.
- G. Brace and Tension (stretcher bar) bands: Pressed steel. At square post provide tension bar clips.
- H. Tension Wire: Poly Vinyl Chloride (PVC) coated metallic coated steel tension wire per ASTM 1664, 7 gauge, diameter wire with tensile strength of 75,000 psi. PVC coating class and color to match chain link fabric.
- I. Truss Rods & Tightener: Steel rods with minimum diameter of 5/16". Capable of withstanding a tension of minimum 2,000 lbs.
- J. Nuts and bolts are galvanized. Standard PDS (self-locking using horizontal bottom channel system).

3.0 EXECUTION

3.1 EXAMINATION

- A. Verify areas to receive fencing are completed to final grades and elevations.
- B. Ensure property lines and legal boundaries of work are clearly established.

3.2 CHAINLINK FENCE FRAMING INSTALLATION

- A. Install chain link fence in accordance with ASTM F567 and manufacturer's instructions.
- B. Locate terminal post at each fence termination and change in horizontal or vertical direction of 30° or more.
- C. Touch up any nicks or scratches of the PVC color coating with liquid PVC paint.

3.3 CHAIN LINK FABRIC INSTALLATION

- A. Fabric: Install fabric on security side, pull fabric taut; thread the tension bar through fabric and attach to terminal posts with tension bands spaced maximum of 15" on center and attach so that the fabric remains in tension after pulling force is released. Install fabric so that it is 2" +/- 1" above finish grade.
- B. Secure fabric using wires ties to line posts at 15" on center and to rails and braces 24" on center, and to the tension wire using hog rings 24" on center. Tie wire shall be secured to the fabric by wrapping it two 360 degree turns around the chain link wire pickets. Cut off any excess wire and bend back so as not to protrude as to avoid injury if a pedestrian may come in contact with the fence.

3.4 CHAIN LINK SWING GATE POST INSTALLATION

- A. Install gate posts in accordance with manufacturer's instructions.
- B. Concrete set gate posts: Drill holes in firm, undisturbed or compacted soil. Holes shall have diameter **4 times** greater than outside dimension of post, and depths approximately **6"** deeper than post bottom. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. Set post bottom **36"** below surface when in firm, undisturbed soil. Place concrete around posts in a continuous pour. Trowel finish around post and slope to direct water away from posts.
 - 1. Gate posts and hardware: Set keeper, stops, sleeves into concrete. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.
- C. Install gates plumb, level, and secure for full opening without interference.
- D. Attach hardware by means which will prevent unauthorized removal.
- E. Adjust hardware for smooth operation. Max operating pressure: 5#.
- F. Touch-up hardware as necessary and to the approval of the Architect.

3.5 ACCESSORIES INSTALLATION

A. Tie Wires: Bend ends of wire to minimize hazard to persons and clothing.

B. Fasteners: Install nuts on side of fence for added security.

3.6 CLEANING

A. Clean up debris and unused material, and remove from the site.

END OF SECTION

SECTION 323119 - DECORATIVE METAL FENCES AND GATES

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Provide and install decorative steel picket fencing panels, steel picket swing gates, and all related accessories as shown on project Drawings and as specified herein.

1.2 RELATED SECTIONS

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. Section 085169 - Gate Hardware
- C. Section 321216 - Asphalt Paving
- D. Section 321313 - Portland Cement Concrete Paving
- E. Section 329000 - Planting: Landscape Work

1.3 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
 - 2. ASTM B 117 - Practice for Operating Salt-Spray (Fog) Apparatus.
 - 3. ASTM D 523 - Test Method for Specular Gloss.
 - 4. ASTM D 714 - Tet Method for Evaluating Degree of Blistering in Paint.
 - 5. ASTM D 822 - Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc, Light and Water Exposure Apparatus.

6. ASTM D 1654 - Test Method for Evaluation of Painted Coated Specimens Subjected to Corrosive Environments.
7. ASTM D 2244 – Test Method for Calculation of Color Differences from Instrumentally Measured Colored Coordinates.
8. ASTM D 2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
8. ASTM D 3359 - Test Method for Measuring Adhesion by Tape Test.
9. ASTM F 2408 – Ornamental Fences Employing Galvanized Steel Tubular Pickets.

1.4 SUBMITTALS

- A. Comply with provisions of the General Conditions, Submittal Procedures.
- B. Shop drawings: Layout of fences and gates with dimensions, details, and finishes of components, accessories, and post foundations.
- C. Product data: Manufacturer's catalog cuts indicating material compliance and specified options.
- D. Samples: Provide samples of materials, including wires and accessories.

1.5 PRODUCT HANDLING AND STORAGE

- A. Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

1.6 QUALITY ASSURANCE

- A. Products from qualified manufacturers having a minimum of 5 years experience manufacturing galvanized chain link fencing and gates will be acceptable by the Architect as equal, if approved in writing, ten (10) days prior to bidding, and if they meet all of the following specifications for design, size gauge of metal parts and fabrication.
- B. Obtain chain link fences and gates, including accessories, fittings, and fastenings, from a single source.

1.7 PRODUCT WARRANTY

- A. All structural fence components (i.e. rails, pickets, and posts) shall be warranted within specified limitations, by the manufacturer for a period of 20 years from date of

original purchase. Warranty shall cover any defects in material finish, including cracking, peeling, chipping, blistering or corroding.

- B. Reimbursement for labor necessary to restore or replace components that have been found to be defective under the terms of manufactures warranty shall be guaranteed for five (5) years from date of original purchase.

2.0 PRODUCTS

2.1 MANUFACTURER

A. The fence system shall conform to Montage Industrial ***Welded and Rackable*** (ATF – All Terrain Flexibility) Ornamental Steel, (specify *Invincible, Classic, Majestic, or Genesis*) design, (specify *extended picket or flush*) bottom rail treatment, (specify *2-Rail, 3-Rail or 4-Rail*) style manufactured by Ameristar Fence Products, Inc., in Tulsa, Oklahoma.or approved equal.

2.2 PANELS AND POSTS

- A. Steel Material: ASTM A653/A653M.
- B. Yield Strength: Minimum 45,000 psi (344 MPa).
- C. Coating Weight: Minimum zinc (hot-dip galvanized) coating weight of 0.60 oz/ft² (184 g/m²), Coating Designation G-60.
- D. Recycled Content: 62% minimum steel material shall be derived from recycled scrap metal.
- E. Color: Black.

2.3 PICKETS

- A. Tubing Pickets: 1 inch square x 16 Ga.
- B. Rails: 1.75 inch x 1.75 inch x .105 inch steel channel.
- C. Picket Hole Spacing: 4.715 inch on center.
- D. Height: 6 feet.
- E. Posts: 2-1/2 inch square x 14 Ga.
- F. Gate posts shall meet the minimum requirements of Table 1.

2.4 FABRICATION

- A. Pickets, rails and posts shall be pre-cut to specified lengths. Rails shall be pre-

punched to accept pickets.

- B. Pickets shall be inserted into the pre-punched holes in the rails and shall be aligned to standard spacing using a specially calibrated alignment fixture. The aligned pickets and rails shall be joined at each picket-to-rail intersection by Ameristar's proprietary fusion welding process, thus completing the rigid panel assembly (Note: The process produces a virtually seamless, spatter-free good-neighbor appearance, equally attractive from either side of the panel).
- C. The manufactured panels and posts shall be subjected to an inline electrodeposition coating (E-Coat) process consisting of a multi-stage pretreatment/wash (with zinc phosphate), followed by a duplex application of an epoxy primer and an acrylic topcoat. The minimum cumulative coating thickness of epoxy and acrylic shall be 2 mils (0.058 mm). The color shall be (specify Black or Bronze). The coated panels and posts shall be capable of meeting the performance requirements for each quality characteristic shown in Table 2 (Note: The requirements in Table 2 meet or exceed the coating performance criteria of ASTM F2408).
- D. The manufactured fence system shall be capable of meeting the vertical load, horizontal load, and infill performance requirements for Industrial weight fences under ASTM F2408.
- E. Swing gates shall be fabricated using 1.75" x 14ga Forerunner double channel rail, 2" sq. x 11ga. gate ends, and 1" sq. x 14ga. pickets. Gates that exceed 6' in width will have a 1.75" sq. x 14ga. intermediate upright. All rail and upright intersections shall be joined by welding. All picket and rail intersections shall also be joined by welding. Gusset plates will be welded at each upright to rail intersection. Cable kits will be provided for additional trussing for all gates leaves over 6'.

3.0 EXECUTION

3.1 EXAMINATION

- A. Verify areas to receive fencing are completed to final grades and elevations.
- B. Ensure property lines and legal boundaries of work are clearly established.

3.2 FENCE INSTALLATION

- A. Fence post shall be spaced according to Table 3, plus or minus ½". For installations that must be raked to follow sloping grades, the post spacing dimension must be measured along the grade.
- B. Fence panels shall be attached to posts with brackets supplied by the manufacturer.
- C. Posts shall be set in concrete footers having a minimum depth of 36" (Note: In some cases, local restrictions of freezing weather conditions may require a greater

depth). The “Earthwork” and “Concrete” sections of this specification shall govern material requirements for the concrete footer.

1. Posts setting by other methods such as plated posts or grouted core-drilled footers are permissible only if shown by engineering analysis to be sufficient in strength for the intended application.

3.3 FENCE INSTALLATION MAINTENANCE

- A. When cutting/drilling rails or posts adhere to the following steps to seal the exposed steel surfaces:
 1. Remove all metal shavings from cut area.
 2. Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole.
 3. Apply 2 coats of custom finish paint matching fence color. Failure to seal exposed surfaces per steps 1-3 above will negate warranty.
 4. Manufacturer’s spray cans or paint pens shall be used to prime and finish exposed surfaces; it is recommended that paint pens be used to prevent overspray. Use of non-manufacturer’s parts or components will negate the manufactures’ warranty.

3.4 GATE INSTALLATION

- A. Gate posts shall be spaced according to the manufacturers’ gate drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected.
- B. Type and quantity of gate hinges shall be based on the application; weight, height, and number of gate cycles.
- C. The manufacturers’ gate drawings shall identify the necessary gate hardware required for the application.
- D. Gate hardware shall be provided by the manufacturer of the gate and shall be installed per manufacturer’s recommendations.

3.5 CLEANING

- A. The contractor shall clean the jobsite of excess materials; post-hole excavations shall be scattered uniformly away from posts.
- B. Clean up debris and unused material, and remove from the site.

Table 1 – Minimum Sizes for Montage Industrial Posts			
<u>Fence Posts</u>	<u>Panel Height</u>		
2-1/2” x 14 Ga.	Up to & Including 6’ Height		
2-1/2” x 12 Ga.	Over 6’ Up to & Including 8’ Height		
<u>Gate Leaf</u>	<u>Gate Height</u>		
	<u>Up to & Including 4’</u>	<u>Over 4’ Up to & Including 6’</u>	<u>Over 6’ Up to & Including 8’</u>
Up to 4’	2-1/2” x 12 Ga.	3” x 12 Ga.	3” x 12 Ga.
4’1” to 6’	3” x 12Ga.	4” x 11 Ga.	4” x 11 Ga.
6’1” to 8’	3” x 12 Ga.	4” x 11 Ga.	6” x 3/16”
8’1” to 10’	4” x 11 Ga.	6” x 3/16”	6” x 3/16”
10’1” to 12’	4” x 11 Ga.	6” x 3/16”	6” x 3/16”
12’1” to 14’	4” x 11 Ga.	6” x 3/16”	6” x 3/16”
14’1” to 16’	6” x 3/16”	6” x 3/16”	6” x 3/16”

Table 2 – Coating Performance Requirements		
<u>Quality Characteristics</u>	<u>ASTM Test Method</u>	<u>Performance Requirements</u>
Adhesion	D3359 – Method B	Adhesion (Retention of Coating) over 90% of test area (Tape and knife test).
Corrosion Resistance	B117, D714 & D1654	Corrosion Resistance over 1,500 hours (Scribed per D1654; failure mode is accumulation of 1/8” coating loss from scribe or medium #8 blisters).
Impact Resistance	D2794	Impact Resistance over 60 inch lb. (Forward impact using 0.625” ball).
Weathering Resistance	D822 D2244, D523 (60° Method)	Weathering Resistance over 1,000 hours (Failure mode is 60% loss of gloss or color variance of more than 3 delta-E color units).

Table 3 – Montage Industrial – Post Spacing By Bracket Type											
Span	For INVINCIBLE® 8' Nominal (91-1/2" Rail)				For CLASSIC, GENESIS, & MAJESTIC 8' Nominal (92-5/8" Rail)						
Post Size	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"	2-1/2"	3"	
Bracket Type	Industrial Flat Mount (BB301)*		Industrial Line 2-1/2" (BB319) 3" (BB320)		Industrial Universal 2.5" (BB302) 3" (BB303)		Industrial Flat Mount (BB301)		Industrial Swivel (BB304)*		
Post Settings ± 1/2" O.C.	94-1/2"	95"	94-1/2"	95"	96"	96-1/2"	96"	96-1/2"	*96"	*96-1/2"	
*Note: When using BB304 swivel brackets on either or both ends of a panel installation, care must be taken to ensure the spacing between post and adjoining pickets meets applicable codes. This will require trimming one or both ends of the panel. When using the BB301 flat mount bracket for Invincible style, rail may need to be drilled to accommodate rail to bracket attachment.											

END OF SECTION

SECTION 328000 - IRRIGATION

1.0 GENERAL

1.1 DESCRIPTION

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- C. Install irrigation system to connect to existing main water line irrigation system using Pepco low flow heads and connected to all planting. Provide 1- 1 1/2" main line for use in greenhouse and to a central location in the garden with hose bibb and removable key.

1.2 RELATED SECTIONS

- A. Section 329000 – Planting: Landscape Work.
- B. Division 16 - Electrical.

1.3 QUALITY ASSURANCE

- A. Manufacturer's Specifications: Follow manufacturer's current printed specifications and drawings in all cases where the manufacturers of articles used in the Contract furnish directions covering points not specified or shown in the drawings.
- B. Ordinances and Regulations: All local, municipal and state laws, codes and regulations governing or relating to all portions of this work are hereby incorporated into and made a part of these Specifications. Anything contained in these Specifications shall not be construed to conflict with any of the above codes, regulations or requirements of the same. However, when these Specifications and Drawings call for or describe materials, workmanship or construction of a better quality, higher standard, or larger size than is required by the above codes and regulations, the provisions of these Specifications and Drawings shall take precedence.
- C. Explanation of Drawings:
 - 1. Coordinate the Irrigation heads with the planting plan- 1 line per shrub 3 per tree. The intent is to have the students be able to assemble the system, measuring and laying out the tubing , contractor to install the risers for the quadra bubblers and purchase all equipment.

1.4 SUBMITTALS

A. Materials List:

1. Within ten (10) days after the award of Contract, submit four (4) copies of the complete lists of materials and cut sheets proposed for installation, and obtain the Landscape Architect's written approval thereof before proceeding. Use only accepted materials and items of equipment. 2 List all materials by manufacturer's name and model number.

B. Manuals:

1. Prior to the final acceptance of the irrigation system, furnish one (1) individually bound Service Manual to the Landscape Architect/District for use by the District. The manual shall contain complete enlarged drawings, diagrams and spare parts lists of all equipment installed, showing manufacturer's name and address. In addition, each Service Manual shall contain the following:
 - a. Index sheet indicating the Contractor's name, address and phone number.
 - b. Copies of equipment warranties and certificates.
 - c. List of equipment with names, addresses and telephone numbers of all local manufacturers' representatives.
 - d. Complete operating and maintenance instructions in sufficient detail to permit operating personnel to understand, operate and maintain all equipment.
 - e. Parts list of all equipment such as controllers, valves, solenoids and heads.
 - f. Letter of certification from manufacturer's representative certifying the controller is properly programmed for ET operation and receipt showing five-year ET Everywhere service contract.

C. Record Drawings:

1. Dimension the location of the following items from two (2) permanent points of reference such as building corners, sidewalks, road intersections, etc.:
 - a. Connection to existing water lines.
 - b. Connection to electrical power.

- c. Gate valves.
- d. Routing of sprinkler lines.
- e. Remote control valves.
- f. Routing of control valves.
- g. Quick coupling valves.
- h. All sleeve locations.
- i. Routing of all control wiring.
- j. Include all invert elevations below 12".

2. Deliver three reproducible sets of Record Drawings to the Landscape Architect within seven (7) working days before the date of Final Review. Delivery of the record drawings shall not relieve the Contractor of the responsibility of furnishing required information in the future.

D. Controller Plan:

1. Permanently install one "bubble diagram" controller plan adjacent to controller housing. The plan shall show the area controlled by each valve and any major permanent structure, such as buildings and roads.
2. Charts to be waterproof and installed as accepted by the Landscape Architect.

E. Maintenance Material -supply the following tools to the Owner:

1. Three (3) sets of specialized tools required for removing, disassembling and adjusting each type of sprinkler, valve or other equipment supplied on this project.
2. Two (2) keys for each type of equipment enclosure.
3. Two (2) keys for each type of automatic controller.
4. Two (2) quick-coupler keys and matching hose swivels for each type of quick-coupling valve installed.
5. All lock keys shall be keyed alike.
6. One (1) Model DB or equal substituted under provisions of Section 01600, soil probe with replaceable tips, available from Oakfield Apparatus at (920) 583-4114, or <http://www.soilsamplers.com>.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Furnish and deliver materials in manufacturer's packaging, bearing original legible labeling.
- B. Handle and store all equipment in accordance with manufacturer's current printed specifications.

1.6 SEQUENCING AND SCHEDULING

- A. Acceptance: Do not install main line trenching prior to acceptance by Inspector of rough grades completed under another Section.
- B. Coordination: Coordinate with the work of other sections to insure the following sequence of events:
 - 1. Sleeves and Conduits: Installation of all sleeves and conduits to be located under paving and through walls prior to placement of those materials.

1.7 WARRANTY

- A. In addition to manufacturer's guarantees or warranties, work shall be warranted for one (1) year from date of final acceptance against defects in material, equipment and workman-ship. Warranty shall also cover repair of damage to any part of the premises resulting from leaks or other defects in materials, equipment and workmanship to the satisfaction of the Owner.
- B. Include a copy of the warranty form in the Operation and Maintenance Manual.

1.8 OPERATIONS

- A. Routine: Inspect and adjust all spray head, bubbler heads and control valves, including raising or lowering of spray head heights to accommodate plant growth and weather conditions.
- B. Controller: Inspect regularly for power interruption and reset clock as required. Adjust station timing to accommodate changes in plant growth and weather conditions.
- C. System Failure: Perform all repairs within one (1) operating period. All replacements to match removed products and materials in all respects. Report promptly all damage not resulting from Contractor's operations. Repair all damage caused by Contractor at no expense to Owner.
- D. Climate Change: Set and program automatic controllers in response to seasonal requirements and requirements of newly-planted materials.

1.9 SOILS REPORT

- A. A soil investigation report has not been prepared for the project.

2.0 PRODUCTS

2.1 PIPE

- A. Piping on pressure side of irrigation control valves: 1. Pipe to be polyvinyl chloride (PVC) 1120-1220. One and one-half inch diameter and smaller to be Schedule 40, to ASTM D1785 84.
- B. Piping on non-pressure side of irrigation control valves: 1. Polyvinyl chloride (PVC) 1 Schedule 40.

2.2 FITTINGS

- A. Fittings for Solvent Welded Pipe: Schedule 40 and Schedule 80, polyvinyl chloride, standard weight, as manufactured by Sloane, Lasco, or accepted equal, to meet ASTM D2466-73 and D2467-73.

2.3 NIPPLES

- A. Plastic: Schedule 80, Type I, Grade 1 polyvinyl chloride (PVC); threaded both ends; ASTM D1784 and D1785; uniformly gray in color.

2.4 IRRIGATION, CONTROLLER

- A. Dig Solar Powered Controller- LEIT-1.

2.5 CONTROL WIRES

- A. Type: Copper with UL accepted for direct burial, size 12-1. Common ground wire with white insulating jacket; individual control wires with insulating jacket of color other than white. Use red wires for control valve wires and black wires for extra wires.
- B. Splices: 'DBR', or 'DBY' by 3M.

2.6 REMOTE CONTROL VALVE

- A. Dig LEIT-11VL-1 1/2 inch line valves.

2.7 BOX FOR REMOTE CONTROL VALVE

- A. Rectangular, green, with bolt-down lid as shown on Drawings.

2.8 SPRINKLER AND BUBBLER HEADS

- A. Pepco quadra bubblers.
- 2.9 PULL BOXES
- A. Rectangular, green, with bolt-down lid
- 2.10 BALL VALVES:
- A. As shown on Drawings.
- 2.11 BALL AND QUICK COUPLER VALVE BOXES
- A. In planted areas as shown on drawings.
 - B. In paved areas to be round, high-density, reinforced concrete with non-settling shoulders and traffic strength lid. As shown on Drawings, Brooks #1-RT, Christy #G5, or equal.
- 2.12 DETECTION WIRES
- A. Unsheathed #12 copper wire.
- 2.13 SLEEVE AND CONDUIT MATERIALS
- A. For Water Lines: PVC 1120-1220, Class 315 pipe.
 - B. For Control Wires: PVC 1120-1220, Schedule-40 electrical conduit.
 - C. For Control Wires and Water Lines: Twice the diameter of the largest pipe going through the sleeve or at least provide minimum 40% clear area inside conduit.
- 2.14 MISCELLANEOUS INSTALLATION MATERIALS
- A. Solvent Cement and Primers for Solvent-weld Joints: #P-70 primer and Weld-on #711 glue or make and type accepted by manufacturer(s) of pipe and fittings. Maintain cement proper consistency throughout use.
 - B. Teflon Tape: Use only Teflon tape on all threaded PVC fittings.
- 2.15 MISCELLANEOUS EQUIPMENT/ACCESSORIES
- A. Concrete Pads: Poured-in-place concrete boxes and vaults.
- 2.16 REMOTE CONTROL VALVE TAGS
- A. Christy remote control valve tags or accepted equal.
- 2.17 OTHER EQUIPMENT

- A. As shown on Drawings

3.0 EXECUTION

3.1 EXAMINATION

- A. Sleeves and Conduits: Verify that all installed sleeving and conduits are undisturbed and are free of defects or errors introduced by the work of other sections.
- B. Water Pressure: Test and verify that existing water pressure is the minimum pressure to operate the irrigation system as specified on the Drawings.
- C. Stub-outs: Verify that all stub-outs to be provided under another contract are correctly sized, located and installed as noted on Drawings. Mark all below grade stub-outs, spare sleeves, and boxes.
- D. Notification: Submit written notification to Inspector within ten (10) working days of above inspections describing all acceptable and non-acceptable site conditions.

3.2 INSTALLATION

- A. Conduits and Sleeves:
 - 1. Coordination
 - a. Provide conduit and sleeve materials and coordinate installation with other trades.
 - b. Do not install other trades conduit, pipes or materials in irrigation trenches.
 - 2. Extent: Install conduits and sleeves where control wires and pipes pass under paving or through walls as shown on Drawings. Extend twelve inches (12") beyond edges of paving and walls and cap ends until ready for use.
- B. Excavating and Trenching:
 - 1. Dig trenches wide enough to allow a minimum of three inches (3") between parallel pipelines. Provide a minimum cover from finish grade as shown on drawings.
- C. Pipe Line Assembly:
 - 1. General:
 - a. Install pipe and fittings in accordance with manufacturer's current printed Specifications.

4. Permanently mark valve box lid with 2" black valve number and controller letter. Install remote control valve tags at each valve.

G. Sprinkler Head Installation:

1. Spray Pop-up Heads:

- a. Install as detailed. Place part-circle pop-up sprinkler heads three four inches (3") from edge of and flush with top of adjacent walks, header boards, curbs and mowing bands or paved areas at time of installation.

H. Automatic Controller:

1. Find electricity and connect complete.
2. General: Install per local code and manufacturer's current printed Specifications.
3. Connection to Valves: Connect remote control valves to controller in clockwise sequence to correspond with station setting beginning with Stations 1, 2, 3, etc. Match valve numbers as shown on irrigation plan.
4. Install two 14 gauge wires to connect all controllers to each other and two spare 14 gauge wire between all controllers. Label spare wires.
5. Connect all controllers to lightening rod as required for lightening protection.
6. Labeling: Affix controller letter (i.e., "A") on inside of controller cabinet door with minimum of one-inch (1") high permanent letter.
7. Irrigation Diagram: Affix a non-fading, waterproof copy of irrigation diagram to cabinet door below controller name. Irrigation diagram to be sealed between two plastic sheets, 20 mil. minimum thickness. Use a reduced copy of the Record Drawing for the irrigation diagram clearly showing all valves operated by the controller, station, number, valve size, and type of planting irrigated. Color code area operated by each valve.

I. Closing of Pipe and Flushing of Lines:

1. Capping: Cap or plug all openings as soon as lines have been installed to prevent entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.

3.3 SLEEVING

- A. Install sleeves where control wires and pipes pass through or under walls.

- B. Install sleeves for control wiring and pipe under walks and paving as shown on the drawing and as required to facilitate a smooth construction sequence.
- C. Sleeves to be of adequate size to accommodate retrieval for repair of wiring or piping and shall extend a minimum of 12" beyond edges of walls, walks and paving.
- D. Coordinate sleeve installation with other trades as required.
- E. Install one spare 3" diameter sleeve adjacent to sleeves shown on drawings and required to complete work. Cap both ends and mark location on pavement as accepted by Inspector.

3.4 PIPELINE ASSEMBLY

- A. Install pipe in accordance with manufacturer's instructions.
- B. Solvent weld PVC pipe and fittings using primers, solvents and methods recommended by manufacturer, except where screw connections are required. Clean pipe and fitting of dirt and moisture before assembly. PVC pipe may be assembled on ground surface beside trench. Snake pipe from side to side of trench bottom to allow for expansion and contraction. Make all connections between PVC pipe and metal valves or pipe with threaded fittings using PVC male adapters.
- C. Use Permatex pipe joint compound (#51D) on threaded PVC fittings, except for sprinkler heads. Assemble threaded PVC fittings finger tight plus one or two turns.

3.5 CONTROL VALVE

- A. Install control wires with sprinkler mains and laterals in common trenches wherever possible. Lay to the side of pipeline. Tie wires in bundles at 10' intervals and allow slack for contraction between ties.
- B. Provide a minimum of 30" of looped extra ground and control wire at each valve and at 200' intervals on long wire runs. Snake wires in trench to allow for contraction of wires.
- C. Control wire splices at remote control valves to be crimped and sealed with specified splicing materials.
- D. Line splices will be allowed only on runs of more than 2500'. Place splices inside of a valve box below grade and mark with a marker.
- E. Install two additional wires in wire bundles for potential connection to controller. Run from furthest valve to controller without splices. More than two wires may be required due to branching of mainline. Install different color wire than active valve wire
- F. Crimp control wire splices at control valves. Seal with specified splicing materials.

In-line splices will be allowed only on runs exceeding 2500 feet and only in junction boxes.

3.6 DETECTION WIRES

- A. Install wire on top of the irrigation main supply line. Install wire on top of the potable water line when the potable line is in a separate trench.

3.7 FIELD QUALITY CONTROL

A. Testing of Irrigation System:

1. Make hydrostatic tests with quick coupler valves installed and capped, remote control valves installed, flow valve open, ball valve open and laterals disconnected when welded PVC joints have cured at least 24 hours. Center load piping with backfill to prevent pipe from moving under pressure. Keep all couplings and fittings exposed.
2. Install two (2) pressure gauges at opposite ends of mainline system. Pump system up to a minimum of 125 psi the day preceding the scheduled test and verify that pressure is holding. Inspect system early following day and immediately notify Inspector if the test confirmation must be postponed.
3. Apply continuous static water pressure of 125 psi in accordance with CalTrans Standard Specifications Section 20-5.03H, except after a drop in pressure (5 psi maximum), then the pressure must stabilize and remain stable for a one (1) hour minimum period before acceptance of the test. Leaks resulting from tests shall be repaired and test repeated until system passes tests.

B. Adjustment of the System:

1. Flush and adjust all sprinkler heads for optimum performance and to prevent over spray on to walks, roadways and buildings.
2. Set all sprinkler heads perpendicular to finished grades unless otherwise noted on the Drawings.
3. When the landscape sprinkler system is completed, perform a coverage test in the presence of the Inspector to determine if the water coverage for planting areas is adequate.
4. Test controllers individually in the presence of the Inspector and the Landscape Architect. Demonstrate that all control valves operate electronically.
5. Demonstrate to Landscape Architect that irrigation scheduling programmed into controller is adequate for plant requirements without causing runoff, and

that scheduling capacities of controller are utilized.

3.8 BACKFILLING AND COMPACTING

- A. General: After system is operating and required tests and reviews have been made, backfill excavations and trenches with clean soil, free of debris.
- B. Backfill for All Trenches: Regardless of the type of pipe covered, compact to minimum 90% density under pavements and 85% under planted areas.
- C. Compacting: Compact trenches only in areas to be planted by thoroughly flooding the backfill. Jetting process may be used in those areas.
- D. Finishing: Dress off areas to finish grades.
- E. Owner's testing agency will test backfill compaction in areas under paving.

3.9 MAINTENANCE

- A. The entire sprinkler irrigation system shall be under full automatic operation for a period of 2 days prior to any planting.
- B. The Owner's Representative reserves the right to waive or shorten the operation period.
- C. Maintain/repair system for full duration of plant maintenance period.
- D. Maintain the landscape to ensure water use efficiency.
- E. Submit a regular maintenance schedule with the Certificate of Completion. The regular maintenance schedule shall include, but not be limited to, routine inspection; adjustment and repair of the irrigation system and its components; aerating and dethatching turf areas; replenishing mulch; fertilizing; pruning; weeding in all landscape areas, and removing and obstruction to emission devices. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.
- F. Repair of irrigation equipment shall be done with the originally installed components or their equivalents.
- G. Implement sustainable or environmentally-friendly practices for landscape maintenance.

3.10 IRRIGATION SCHEDULE

- A. Program the controller for the plant establishment period and the one 12-month irrigation schedule. Program and adjust controller to apply water as required for healthy plant growth, maintenance and water conservation.

- B. For the efficient use of water, prepare manage, and evaluate irrigation schedule to utilize the minimum amount of water required to establish and maintain plant health and meet the following criteria:
1. Irrigation scheduling shall be regulated by automatic irrigation controllers.
 2. Overhead irrigation shall be scheduled between 10:00 p.m. and 7:00 a.m. unless weather conditions prevent it. Operation of the irrigation system outside the normal watering window is allowed for auditing and system maintenance.
 3. For implementation of the irrigation schedule, particular attention must be paid to irrigation run times, emission device, flow rate, and current reference evapotranspiration, so that applied water meets the Estimated Total Water Use. Total annual applied water shall be less than or equal to Maximum Applied Water Allowance (MAWA). Actual irrigation schedules shall be regulated by automatic irrigation controllers using current reference evapotranspiration data (e.g., CIMIS) or soil moisture sensor data.
 4. Program the controller to operate automatically based on Evapotranspiration (ET) data ET.
 5. Parameters used to set the automatic controller shall be developed and submitted for each of the following
 - a. The plant establishment period;
 - b. The established landscape; and
 - c. Temporarily irrigated areas.
 6. Each irrigation schedule shall consider for each station all of the following that apply:
 - a. Irrigation interval (days between irrigation);
 - b. Irrigation run times (hours or minutes per irrigation event to avoid runoff);
 - c. Number of cycle starts required for each irrigation event to avoid runoff;
 - d. Amount of applied water scheduled to be applied on a monthly basis;
 - e. Application rate setting;
 - f. Root depth setting;

- g. Plant type setting;
- h. Soil type;
- i. Slope factor setting;
- j. Shade factor setting; and
- k. Irrigation uniformity or efficiency setting.

3.11 REVIEWS PRIOR TO ACCEPTANCE

- A. Notify the Owner's Representative in advance for the following reviews, according to the time indicated:
 - 1. Piping installation prior to cover
 - 2. Water test for leakage
 - 3. Test for coverage

END OF SECTION 328000

SECTION 329000 - PLANTING: LANDSCAPE WORK

1.0 GENERAL

1.1 SUMMARY

- A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Special Conditions and Division 1 of these Contract Documents.
- B. This Section includes all labor, materials, equipment, operations, or methods listed, mentioned, or scheduled on the plans and/or herein specified, including all incidentals necessary and required for completion of work under this Section.
- B. Provide and install all landscaping as shown on project Drawings and as specified herein, including all planting and maintenance under a sixty (60) calendar-day maintenance period (see part 3.8 of this Section).

1.2 RELATED SECTIONS

- A. Division 31 - Earthwork
- B. Section 328000, Irrigation

1.3 GENERAL CONDITIONS

- A. The contractor shall maintain adequate protection of his work from damage and shall protect the County's and adjacent property and related appurtenances from injury or loss arising from this Contract. Damaged or disturbed items shall be replaced with equal by the Contractor at no cost to the County.
- B. The Contractor shall pay Federal, State, and Local Sales and/or Use Taxes to materials, processes, or devices purchased or used in connection with the work. Local, Municipal, and State Laws and Rules and Regulations governing or relating to any portion of this work are hereby incorporated into these Specifications.

1.4 PERMITS, LICENSES, AND INSPECTIONS

- A. Any permit, license and/or inspection required by the legal authorities or agencies having jurisdiction over the construction or installation of the work as shown on the Plans or specified herein, shall be paid and obtained by the Contractor at the proper time.

1.5 BONDS AND INSURANCES

- A. The Contractor shall furnish the appropriate bond(s) in the amount of the required per cent of his bid proposal and carry insurance as required by the County. The Contractor shall be informed of these requirements from the County prior to submitting his bid proposal.

1.6 EXISTING CONDITIONS

- A. The Contractor shall visit the subject site to review the various existing conditions. A condition found to deviate from the Plans and Specifications shall be reported to the County's Authorized Representative prior to submitting his bid proposal.

1.7 PURPOSE OF DOCUMENTS

- A. The intent of the documents is to include, unless otherwise stated, the labor, materials, equipment, appliances, and transportation for the proper execution of the work as required for complete construction as shown on the Plans and specified herein. The Contractor shall be responsible for complete layout of improvements as shown on the Plans and as specified herein. Written dimensions shall take precedence over scaled dimensions. Follow as closely as practical making no alterations unless prior review and appropriate action is taken by the District's Authorized Representative.
- B. Each plant shall be installed in locations as shown on the Plans. Plants improperly located shall be relocated at no additional cost to the District. Notwithstanding is the fact that these documents may be deficient in setting forth a complete detailed description of the work to be done.

1.8 RECORD DRAWINGS

- A. On one set of the Plans, the Contractor shall record accurately changes in the work which constitute departures from the original Contract Drawings. The Contractor shall dimension from two permanent points of reference (building corners, sidewalks, or road intersections, etc.) the location of the following items:
 - 1. Connections to existing water lines
 - 2. Routing of pressure supply lines
 - 3. Sprinkler control valves
- B. Upon completion of each increment of work, the Contractor shall transfer information including the dimensions to a clean set of Ozalid prints of the Plans and the changes. The dimensions and changes shall be recorded in a legible and workmanlike manner to the satisfaction of the Authorized Representative. Prior to stage acceptance, these Plans shall be presented to the Authorized Representative for review.

2.0 PRODUCTS

2.1 Materials

- A. Plant Material:
 - 1. Plants and planting material shall meet the specifications of Federal, State, and County laws requiring inspection for plant disease and insect control. Inspection certificates required by law shall accompany shipments, of which a copy of each inspection certificate shall be given to the District.

2. Plants shall be true to botanical name and one of each bundle or lot shall be tagged with the botanical name and container size of the plants in accordance with the standards of practice recommended by the American Association of Nurserymen.
3. Plants shall be healthy, vigorous stock, free of insects and disease, and not root-bound. Quality and size shall conform with the current edition of "Horticultural Standards" for number one grade nursery stock as adopted by the American Association of Nurserymen. Plants which are not true to botanical name shall be removed from the site and replaced with acceptable plants at no extra cost to the District. Botanical names shall take precedence over common names.
4. Due to ever changing availability of plant material, the Contractor may submit plant type substitution requests to the Authorized Representative for review, prior to ordering.

3.0 EXECUTION

3.1 PREPARATION

A. Finish Grading:

1. Planting areas shall be graded to the elevations indicated on the site plan. Grades not otherwise indicated shall be uniform levels or slopes between points where elevations are given. Minor adjustments of finish grades shall be made at the direction of the Authorized Representative, if required, at no additional cost to the District.
2. Finish grade shall be smooth, even, and of a uniform plane with no abrupt changes of surface. Soil area adjacent to buildings shall slope away from the buildings to allow a natural runoff of water, and surface drainage shall be directed as indicated on the drawings by remodeling surfaces to facilitate the natural runoff of water. Low spots and pockets shall be graded to drain properly.
3. Shrub areas: The finish grade of shrubbery areas shall be 1-1/2 inches below the grade of adjacent pavement, walks, curbs, header, or walls. An exception to the above requirements shall be made wherever drainage conditions may require flush grade.

B. Soil Preparation:

1. Prior to planting, Contractor shall obtain soils test from certified soil testing lab and send copy to Architect. Commercial fertilizer shall be as per recommendations of soils lab. It shall be delivered to the site in bags labeled with manufacturer's guaranteed analysis. If stored at the site, fertilizer shall be protected from the elements prior to use.

2. Organic Soil Amendment (OSA): Shall be nitrogenized fine grained Redwood sawdust, or approved equal. The Contractor shall submit samples to the Architect for review prior to ordering of material. Particle size, mix proportions, Ph, and salinity content shall conform to manufacturer's literature.
3. Backfill Mix for Shrubs and Trees: Shall consist of 70% native soil excavated from the planting holes (free of rock/debris 1 inch or greater in size), 30% nitrogenized redwood sawdust (OSA), and the following additional amendments:

Soil Amendments

Container Size	Soil Fertility
1. Shrubs (1, 5, & 15 gallon)	1. As per soils lab recommendation
2. Trees (5 & 15 gallon & 24" box)	2. As per soils lab recommendation

4. Using a rotary-cultivator, thoroughly till three inches of OSA a minimum of two passes of all planting areas six inches deep in two directions 90 degrees to each other. Rake entire area to remove clods and stones over one inch in diameter, and sticks, etc. Maintain adequate distance from mud sills in accordance with local codes.

C. Planter Preparation

1. Excavate planter areas and tree wells in paved interior to a depth of 10" or below paving base rock, whichever is deeper.
2. Dispose of all base rock from planter areas off site.
3. Back fill planters with top soil. Submit source and sample to Architect prior to installation.
4. Back fill into existing sub soil to a depth of 6" to create a transitional layer of soil.
5. Water down and lightly compact topsoil to remove air pockets and achieve specified grade

3.2 SHRUB AND TREE PLANTING

- A. Excavation of planting holes shall be a minimum of twice the depth and diameter of the plant root ball.
- B. Sides and the bottom of the planting hole shall be thoroughly "broken up" and loosened so that no "auger slick" or compaction of soil exists.

- C. Planting trees: minimum 1" per hour drainage from planting pit. If not achieved, notify Architect.
- D. Fill holes with amended backfill mixture to the proper height to receive the plant and thoroughly tamp the mixture.
- E. Lightly loosen the outer edge of the root ball soil and set the plant in the center of the hole.
- F. Compact backfill mixture around root ball until 2/3 of the hole is filled, then water thoroughly.
- G. Place remaining backfill in hole so that crown of plant is 1-1/2" to 2" above surrounding grade.
- H. A four-inch-high water basin shall be constructed around each shrub and tree as per detail on the Plans (except when plant is located within turf area).
- I. Each plant basin shall be mulched by applying nitrogenized redwood sawdust to a depth of two inches, evenly spread over the entire basin area and soaked thoroughly.
- J. Trees to be planted in interior paved walkways as indicated on the drawings shall be planted with deep-root planters with perforated pipe and sock for aeration.

3.3 INSTALLATION OF TOP DRESSING

- A. Following all plant material planting, refined raking of finish grades, application and watering-in of weed control treatment, all shrubs and/or ground cover areas shall be top dressed.
- B. All top dressing will be "redwood chips". Contractor shall submit samples to County's Authorized Representative for review and appropriate action. Maximum chip size shall be 1/2" to 3/4" diameter of uniform color and consistency.
- C. The Contractor shall spread the top dressing a minimum of 2 inches deep over all areas, and shall uniformly rake so as to create a smooth plane. Neat uniform appearance of all top dressing shall be maintained at all times and is solely the responsibility of the contractor.

3.4 STAKING AND GUYING TREES

- A. Trees shall be staked as per details on the Drawings.
- B. Tree stakes shall be treated Lodge Pole Pine: two, 2 inch in diameter, 10 feet long for 15 G.C./24" box size trees; 3 inch in diameter, 12 foot poles for 36 inch box or larger.
- C. Trees shall be tied as per tree staking detail. Over-sized trees shall have 12' poles and two or more ties, as determined by the Architect.
- D. Staking poles shall not interfere with the lateral branching of trees.

3.5 CLEANUP

- A. After planting and irrigation operations have been completed, the Contractor shall remove trash, empty plant containers, and tools and equipment used in this work, or any other debris accumulated by the work, as specified herein, from the site of the work.
- B. Scars, ruts, or other marks in the area caused by this work shall be repaired at the Contractor's expense, and the ground left in a neat and orderly condition throughout the site or work at no additional cost. All hard surface paved areas shall be thoroughly cleaned.

3.6 FIELD OBSERVATIONS AND ACCEPTANCE

- A. The County's Authorized Representative shall perform at least two project field observations upon completion of each phase of the work. Field observations shall be arranged by the Contractor by notification to the Authorized Representative two days prior to field observation date.
 - 1. The first field observation shall take place upon completion of the designated maintenance period. Discrepancies noted by the District's Authorized Representative must be corrected and written notice of completion of remedial work delivered to the C prior to the next field observation.
 - 2. The second field observation will take place upon completion of all remedial work. If the job is satisfactory and to the best of the District's Authorized Representative's knowledge, information, and belief, that the work is carried out in general conformance with the Plans, Specifications, and Contract, and general design intent, a written notice of final review shall be prepared by the Authorized Representative and submitted for stage approval to the District, prior to termination of the maintenance period and stage acceptance. The District shall issue stage acceptance to the Contractor.
- B. If the job is **NOT** satisfactory, the Contractor shall continue the maintenance period at no cost to the District until stage acceptance by the District has been issued.
- C. Irrigation:
 - 1. Field observation of final pressure rating of mainline testing and observation of pressurized lateral line tests.
 - 2. Field observation of irrigation coverage test.
 - 3. Field observation of overall irrigation system operation and compliance with the plans and installation procedures as specified herein.
- D. Planting:
 - 1. Field observation of final finish grading to review drainage and general appearance before planting.

2. Field observation of plants in containers prior to planting.
3. Field observation of plant locations to review general conformance with the Plans and planting procedures as specified herein.

3.10 MAINTENANCE

- A. It shall be the sole responsibility of the Contractor to maintain grades, planting, and irrigation as specified herein through stage acceptance by the District and review by the District's Authorized Representative. Maintenance shall include responsibility for losses due to neglect or vandalism, and continue for a full 60 calendar days initiating after the job is fully completed and written notice of start of maintenance is received from the District.
- B. Finish grade shall be maintained to facilitate run-off with silt build-up at back of walk and headers removed.
- C. Irrigation system to be checked minimum once a week, heads lowered or raised as needed. Leaks, damage, and/or settling shall be repaired immediately.
- D. Plantings shall be weeded, fertilized, cultivated, sprayed, and pruned as necessary to produce a healthy plant specimen.
- E. Irrigation shall be checked, heads adjusted for coverage and over-spray, no water on buildings, walks, parking areas, etc. Controller shall be labeled to location of valves per Irrigation Plans.
- F. Guarantee of planting and irrigation for one calendar year shall commence at the time of stage acceptance by County or Authorized Representative.

3.11 GUARANTEE PERIOD

- A. The guarantee period will commence upon issuance of stage acceptance by the County to the Contractor at the termination of the maintenance period.
- B. Planting Guarantee
 1. The Contractor will guarantee the planting (as specified herein) for a period of one calendar year. The signing of the Contract for work is considered as the written guarantee to carry out this provision.
 2. Plant material which is lost due to improper planting or plant diseases or pests which were present at the time of the start of the guarantee period shall be replaced by the Contractor at no cost to the County.
- C. Completion of Guarantee Period and Final Acceptance
 1. A final field observation will take place upon completion of the designated guarantee period.
 2. Discrepancies noted by the County's Authorized Representative, which are a direct cause of the Contractor's work as shown on the Plans and specified

Project: 855 East Laurel Drive Emergency Shelter
Project No. 8875
Bid No. 10736

herein, shall be made correct and complete to the satisfaction of the County at no additional cost to the County.

END OF SECTION

**Division 33:
Utilities**

SECTION 33 10 00 - WATER UTILITIES

1.0 GENERAL

1.1 SECTION INCLUDES

- A. Pipe and fittings for site water line including domestic water line and fire water line.
- B. Valves and back flow preventer.

1.2 RELATED SECTIONS

- A. Section 312216 - Excavating.
- B. Section 312316.13 - Trenching.
- C. Section 312333 - Backfilling.
- D. Section 220000 - Plumbing.

1.3 REFERENCES

- A. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
- B. ANSI/AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
- C. ANSI/AWWA C105 - Polyethylene Encasement for Ductile Iron Piping for Water and Other liquids.
- D. ANSI/AWWA C111- Rubber-Gasket Joints for Ductile Iron and Grey-Iron Pressure Pipe and Fittings.
- E. ANSI/AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
- F. ANSI/AWWA C509 - Resilient Seated Gate Valves 3 in through 12 in NPS, for Water and Sewage Systems.
- G. ANSI/AWWA C600 - Installation of Ductile-Iron Water Mains and Appurtenances.
- H. ANSI/AWWA C900 - Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch, for Water.

- I. ASTM D2241 - Poly Vinyl Chloride (PVC) Plastic Pipe(SDR-PR).
- J. ASTM D3139 - Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.
- K. AWWA C901 - Polyethylene (PE) Pressure Pipe, Tubing, and Fittings, 1/2 inch through 3 inch, for Water.
- L. City Public Works Design stds. and std details (section 2).

1.4 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 01 78 39.
- B. Accurately record actual locations of piping mains, valves, connections, and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with City standards.
- B. Valves: Manufacturer's name and pressure rating marked on valve body.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Section 01 60 00.
- B. Deliver and store valves in shipping containers with labeling in place.

1.7 SCOPE OF WORK

- A. All work shall conform to the City Standards.

2.0 PRODUCTS

2.1 PIPE

- A. Ductile Iron Pipe: ANSI/AWWA C151:
- B. PVC Pipe: ANSI/AWWA C900 Class 150:
 - 1. Fittings: ANSI/AWWA C111, cast iron.
 - 2. Joints: ASTM D3139 compression gasket ring.

3. Trace Wire: Magnetic detectable conductor, plastic covering, imprinted with "Water Service" in large letters.

C. Polyethylene Pipe: AWWA C901:

1. Fittings: AWWA C901, molded or fabricated.
2. Joints: Compression.
3. Trace Wire: Magnetic detectable conductor, plastic covering, imprinted with "Water Service" in large letters.

2.2 GATE VALVES - Up to 3 Inches (75 mm):

- A. Manufacturers: Muller or approved equal.
- B. Brass or Bronze body, non-rising stem, inside screw, single wedge or disc, compression ends, with control rod, post indicator, extension box and valve key.

2.3 GATE VALVES - 3 Inches (75 mm) and Over

- A. Manufacturers: Muller or approved equal.
- B. ANSI/AWWA C509, Iron body, bronze trim, non-rising stem with square nut, single wedge, resilient seat, flanged ends, control rod, and extension box .

2.4 ACCESSORIES

- A. Concrete for Thrust Blocks: Per City standards.
- B. Backflow Preventer: Per City Standards.
- C. Meter: Per City standards.

3.0 EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions under provisions of Section 01039.
- B. Verify that building service connection and municipal utility water main size, location and invert are as indicated.

3.2 PREPARATION

- A. Ream pipe and tube ends and remove burrs.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare pipe connections to equipment with flanges or unions.

3.3 BEDDING

- A. Excavate pipe trench in accordance with City standards for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.
- B. Place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 8 inches (200 mm) compacted depth.
- C. Backfill around sides and to top of pipe with fill, tamped in place and compacted.
- D. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION - PIPE

- A. Maintain separation of water main from sewer piping in accordance with City standards.
- B. Install ductile iron piping and fittings to ANSI/AWWA C600.
- C. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- D. Form and place concrete for thrust blocks at each elbow or change of direction of pipe main.
- E. Establish elevations of buried piping to ensure not less than 3 ft. of cover in the public right of ways and a minimum 2.5 ft. onsite.
- F. Install trace wire continuous over top of pipe.
- G. Backfill trench in accordance with Section 31 23 33.13.

3.5 INSTALLATION - VALVES AND HYDRANTS

- A. Set valves on solid bearing.
- B. Center and plumb valve box over valve. Set box cover flush with finished grade.

3.6 SERVICE CONNECTIONS

- A. Provide water service to City standards with reduced pressure backflow preventer and water meter with by-pass valves with sand strainer.

3.7 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Section 01 45 23.
- B. Compaction testing will be performed in accordance with ANSI/ASTM D1557.
- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.
- D. Frequency of Tests: As directed by the City Engineer.

END OF SECTION

SECTION 33 40 00 - STORM DRAINAGE

1.0 GENERAL

1.1 SECTION INCLUDES

- A. Site storm sewerage drainage piping, fittings and accessories.
- B. Connection of building storm water drainage system to City storm drain.
- C. Catch basins, paved area drainage and Site surface drainage.

1.2 RELATED SECTIONS

- A. Section 31 23 16.13 - Trenching: Excavating for sewer system piping.
- B. Section 31 23 16.13 - Trenching: Backfilling over piping up to subgrade elevation.

1.3 REFERENCES

- A. ANSI/ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
- B. ANSI/ASTM D1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb (4.54 Kg) Rammer and 18 inch (457 mm) Drop.
- C. ANSI/ASTM D3034 - Poly (Vinyl Chloride) (PVC) (SDR-26) Sewer Pipe and Fittings.
- D. All work to be done to Section 4 (sewers) of the City of Morgan Hill standard Spec.

1.4 DEFINITIONS

- A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.5 PROJECT RECORD DOCUMENTS

- A. Submit under provisions of Section 01700.
- B. Accurately record actual locations of pipe runs, connections, catch basins, cleanouts and invert elevations.
- C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.6 REGULATORY REQUIREMENTS

- A. Conform to City standards for materials and installation of the Work of this section.

1.7 FIELD MEASUREMENTS

- A. Verify that field measurements and elevations are as indicated.

1.8 COORDINATION

- A. Coordinate work under provisions of Section 01039.
- B. Coordinate the Work with termination of storm sewer connection outside building, connection to City storm sewer and trenching.

2.0 PRODUCTS

2.1 SEWER PIPE MATERIALS

- A. Reinforced Concrete Pipe: ANSI/ASTM C76, Class III & V; mesh reinforcement; inside nominal diameter of 12 to 24 inches, bell and spigot end joints.
- B. Reinforced Concrete Pipe Joint Device: ANSI/ASTM C443, rubber compression gasket joint. *A3
- C. Plastic Pipe: ANSI/ASTM D3034, (SDR-35) Poly Vinyl Chloride material; inside nominal diameter of 6 inches, bell and spigot style rubber ring sealed gasket joint.

2.2 CATCH BASINS

- A. Lid and Frame: As shown on City standard details and Civil Plan.
- B. Shaft Construction and Cone Top Section: As shown on plans.

3.0 EXECUTION

3.1 EXAMINATION

- A. Verify that excavation base is ready to receive work and excavations, dimensions, and elevations are as indicated on drawings.

3.2 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with course aggregate.
- B. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.

3.3 BEDDING

- A. Excavate pipe trench in accordance with Section 31 23 16.13 for work of this section. Hand trim excavation for accurate placement of pipe to elevations indicated.
- B. Place bedding material at trench bottom, level materials in continuous layer not exceeding 8 inches compacted depth.
- C. Maintain optimum moisture content of bedding material to attain required compaction density.

3.4 INSTALLATION - PIPE

- A. Lay pipe to slope gradients noted on layout drawings.

3.5 INSTALLATION - CATCH BASINS AND CLEANOUTS

- A. Form bottom of excavation clean and smooth to correct elevation.
- B. Form and place cast-in-place concrete base pad, with provision for storm sewer pipe end sections.
- C. Level top surface of base pad to receive concrete shaft sections, sleeved to receive storm sewer pipe sections.
- D. Establish elevations and pipe inverts for inlets and outlets as indicated.
- E. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.6 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section 01 45 23.
- B. Request inspection prior to placing aggregate cover over pipe.
- C. Compaction testing will be performed in accordance with ANSI/ASTM D1557.
- D. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.

3.7 PROTECTION

- A. Protect finished Work under provisions of Section 01 60 00.
- B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION