NAPA COUNTY
DEPARTMENT OF PUBLIC WORKS
1195 THIRD STREET, ROOM 101
NAPA, CALIFORNIA  94559

SPECIFICATIONS

FOR
CARNEROS FIRE STATION 210
PW 20-27

NOTICE TO CONTRACTORS

PROPOSAL FORM

BONDS

CONTRACT FOR CONSTRUCTION

SPECIAL PROVISIONS

Section “A” – General Conditions
Section “B” – General Requirements
Section “C” – Technical Specifications

Contractor shall possess a Class ‘B’ License at the time of contract award.

MANDATORY PRE-BID MEETING: 10 AM, June 2, 2021
LAST DAY FOR QUESTIONS: 12 PM, June 11, 2021

BID DUE DATE: 11:30 AM, June 17, 2021

Approved

Juan S Arias   County Engineer RCE No. C63365
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<td>32</td>
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</tbody>
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SECTION C – TECHNICAL SPECIFICATIONS
NOTICE TO CONTRACTORS

Proposals shall be submitted under sealed cover plainly marked as a proposal, and identifying the project to which the proposal relates and the date of the bid opening therefore. Proposals which are not properly marked will be rejected. Sealed proposals will be received at the office of the Clerk of the Board of Supervisors, Napa County Administration Building, 1195 Third Street, Room 310, Napa, California, until 11:30 A.M. on June 17, 2021 (no bids will be accepted after 11:30 A.M.) after which they will be opened and read under the social distancing protocol in enforcement at the time, for the construction in accordance with the Plans and Special Provisions thereto, to which special reference is made as follows:

Carneros Fire Station 210, PW 20-27

Engineer Estimate: $1,400,000

Due to the COVID-19 pandemic, physical attendance in the meeting room is not allowed at this time and all attendance by the public will be virtual through the link provided below.

Zoom Meeting link: https://countyofnapa.zoom.us/j/85730921793
To listen to bid opening by phone, dial: 1 (669) 900-6833
Zoom Meeting ID: 857 3092 1793

Bids are required for the entire work called for by the Plans and Specifications, and neither partial nor contingent bids will be considered.

Bidders are responsible for monitoring www.countyofnapa.org/1607/Current-Projects for addendums which may be issued up until 72 hours prior to bid opening. Complete sets of Contract Documents must be used in preparing Bids. The County does not assume responsibility for errors or misinterpretations resulting from the use of incomplete sets of Contract Documents.

Bid results of the three apparent lowest bidders with their subcontractor’s list will be on the County’s website www.countyofnapa.org/1607/Current-Projects by the business day after the bids are publicly opened and read.

The Plans and Specifications may be seen at the Napa County Department of Public Works, 1195 Third Street, Room 101 Napa, California. Plans, Special Provisions (excluding State Standard Specifications and other documents included by reference), Proposal Forms and Contract Forms may be obtained at said office by prospective bidders licensed by the State of California for the type of work involved or may be found electronically at www.countyofnapa.org/1607/Current-Projects.

Pursuant to 1771.1 of the Labor Code, a contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract

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Code, or engage in the performance of any contract for public work, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

Pursuant to Sections 1770, et. seq., of the California Labor Code, the contractor and all subcontractors shall pay not less than the prevailing rate of per diem wages as determined by the Director of the California Department of Industrial Relations. Copies of such prevailing rate of per diem wages are on file at the Napa County Department of Public Works where copies will be made available to any interested party on request. These rate determinations may also be found on the State of California Department of Industrial Relations’ website at: http://www.dir.ca.gov/dlsr/DPreWageDetermination.htm. Contractors and subcontractors shall also submit certified payroll records, employ apprentices, and comply with working hour conditions as required by the Labor Code.

No bid will be considered unless it is made on a blank form furnished with these bid specifications and is made in accordance with the provisions of the proposal requirements and conditions set forth under Section 2 of the 2018 Standard Specifications of the State California, Department of Transportation, except as modified by the Special Provisions.

The Contractor shall possess a Class B license at the time of the Contract award. A bid guarantee in the amount of 10% of the total bid shall accompany the bid.

The successful bidder shall be required to furnish a Performance Bond in an amount equal to 100% of the contract price and a Labor and Material Bond in an amount equal to 100% of the contract price with good and sufficient surety.

PRE-BID MEETING: A mandatory on-site meeting for contractors is scheduled for June 2, 2021, at 10:00 A.M. at 5260 Old Sonoma Road, Napa, CA 94559. If you plan to attend the pre-bid meeting, please contact Daniel Basore at Daniel.Basore@Countyofnapa.org by no later than 12 P.M. on June 1, 2021. As the parcel is currently vacant the address doesn’t take you directly to the site, a follow up e-mail with instructions will be sent to anyone who plans to attend the pre-bid meeting.

All questions must be e-mailed, or mailed by 12:00 P.M. on June 11, 2021 to Daniel Basore at Daniel.Basore@Countyofnapa.org, Napa County Public Works, 1195 Third St. Room 101, Napa, CA 94559.

The Board of Supervisors reserves the right to reject any or all bids. By order of the Board of Supervisors of the County of Napa, State of California made this May 18, 2021.
PROPOSAL FORM
(MAY BE DETACHED AND SUBMITTED ALONE)

TO THE DIRECTOR OF PUBLIC WORKS
OF NAPA COUNTY
NAPA, CALIFORNIA

FOR:
Carneros Fire Station 210
PW 20-27

NAME OF BIDDER ___________________________________________________________

BUSINESS ADDRESS _________________________________________________________

E-MAIL ADDRESS ___________________________________________________________

LICENSE NUMBER ___________________________________________________________

DIR REGISTRATION NUMBER _________________________________________________

Location: The work to be done and referred to herein is in Napa County, State of California, more particularly described as follows:

Carneros Fire Station 210
PW 20-27

The undersigned, as contractor, declares that the only person or parties interested in this proposal as principals are those named herein; that this proposal is made without collusion with any other person, firm or corporation; has visited the Site of Work as described in the Contract and has examined and familiarized themselves with the existing conditions relating to the construction which will be performed, the annexed proposed form of contract, the Plans, Special Provisions and Standard Specifications; and they propose, and agree if this proposal is accepted, that they will contract with Napa County, in the form of the copy of the contract annexed hereto, to provide all necessary machinery, tools, apparatus and other means of construction, and to do all the work and furnish all the materials specified in the contract, in the manner and time therein prescribed, and according to the requirements of payment therefore the following item prices to wit:
## Carneros Fire Station 210
### PW 20-27

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Item Description</th>
<th>Units</th>
<th>Qty</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobilization</td>
<td>LS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Demolition</td>
<td>LS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Site Grading</td>
<td>LS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Pre-Engineered Structure</td>
<td>LS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Concrete</td>
<td>LS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Paving</td>
<td>LS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Surveying</td>
<td>LS</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Total Base Bid**

**TOTAL BASE BID:** $ ________________________________

**TOTAL BASE BID:** (Written Number) ________________________________

____________________________________________________________________

/100 DOLLARS

**Note:** Lowest bid is determined from Total Base Bid and does not include additive alternate in determination.

<table>
<thead>
<tr>
<th>Additive Alternates</th>
<th>Units</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Backup Generator</td>
<td>LS</td>
<td>1</td>
</tr>
<tr>
<td>2 Monument Sign with Lighting</td>
<td>LS</td>
<td>1</td>
</tr>
<tr>
<td>3 Hose Drying Rack</td>
<td>LS</td>
<td>1</td>
</tr>
<tr>
<td>4 Ground Mounted 25’ Flag Pole with Lighting</td>
<td>LS</td>
<td>1</td>
</tr>
<tr>
<td>5 Fire Suppression System with Fire Alarm</td>
<td>LS</td>
<td>1</td>
</tr>
<tr>
<td>6 Storefront Window</td>
<td>LS</td>
<td>1</td>
</tr>
<tr>
<td>7 Cast Aluminum Building Identifications Letters, 9’ High, Mounted to face of wall Panels</td>
<td>LS</td>
<td>1</td>
</tr>
<tr>
<td>8 Aluminum Sectional Overhead Door in lieu of Steel Sectional Overhead Door</td>
<td>LS</td>
<td>1</td>
</tr>
<tr>
<td>9 Driveway Site Lighting at West Property Edge</td>
<td>LS</td>
<td>1</td>
</tr>
</tbody>
</table>

**Subtotal**

*Authorized Signature Name Title*

*Authorized Signature Name Title*

* If a corporation, this document must be signed by two corporate officers. The first signature must be either the Chairman of the Board, President, or any Vice President. The second signature must be the Secretary, an Assistant Secretary, the Chief Financial Officer, or any Assistant Treasurer. **In the alternative, a single corporate signature is acceptable when accompanied by a corporate document demonstrating the legal authority of the signature to bind the company.**

PROPOSAL FORM

P-2
INSTRUCTIONS TO BIDDERS

INSTRUCTIONS TO CONTRACTORS

The Bid and Determining Low Bidder.

Bids are required for the entire work. The amount of the bid for comparison purposes will be the Total Base Bid. The Additive Alternates will not be used to determine the lowest bidder, however the County can, at its discretion and available funding, select any Alternate or combination thereof to include in its construction contract.

The contractor shall set forth for each item of work, in clearly legible figures, as item price and a total for the item in the respective spaces provided for this purpose. In the case of unit basis items, the amount set forth under the "Total" column shall be the extension of the item price bid on the basis of the estimated quantity for the item.

In case of a discrepancy between the item price and the total set forth for the item, the item price shall prevail, provided, however, if the amount set forth as an item price is ambiguous, unintelligible or uncertain for any cause, or is omitted, or in the case of unit basis items, is the same amount as the entry in the "Total" column, then the amount set forth in the "Total" column for the item shall prevail in accordance with the following:

1) As to lump sum items, the amount set forth in the "Total" column shall be the item price.
2) As to unit basis items, the amount set forth in the "Total" column shall be divided by the estimated quantity for the item and the price thus obtained shall be the item price.

In case of a discrepancy between the Total Base Bid and the calculated total of the amounts in the “Total” column for each line item determined after using the above procedures for resolving the discrepancies, the calculated total of the amounts set forth in the “Total” column for shall become the Total Base Bid and shall be used for comparison purposes in determining the lowest bid.

It is understood and agreed that the quantities of work under each item are approximate only, being given for a basis of comparison of proposal, and the right is reserved to the County to increase or decrease the amount of work under any item as may be required, in accordance with provisions set forth in the specifications for this project.

It is further understood and agreed that the total amount bid for the project does not constitute an agreement to pay a lump sum for the work unless it specifically so states.

If this proposal shall be accepted and the undersigned shall fail to contract as aforesaid and to give the two bonds in the sums to be determined as aforesaid, with surety satisfactory to the Director of Public Works within eight (8) days, not including Saturdays, Sundays and legal holidays, after the contractor has received notice from the County Engineer that the contract has been awarded to him, the Director of Public Works may, at its option, determine that the contractor has abandoned the contract, and thereupon this proposal, and the acceptance thereof shall be null and void, and the forfeiture of such security accompanying this proposal shall operate and the same shall be the property of Napa County.
Form of Bid.
(1) To receive consideration, bids shall be made on the forms and in the manner set forth in the Notice to Contractors.

(2) Bids received after the date and time advertised for opening will be considered non-responsive and will be rejected.

(3) Each bid must be completed in ink, typewritten or computer generated, and all changes and/or erasures must be initialed in ink. Each bid must be signed in ink by an authorized representative of the firm.

(4) Contractors shall not change the bid form nor make additional stipulations on the bid form which are not consistent with the provisions of the specifications.

Taxes. Bid prices shall include all applicable federal, state, and local taxes.

Receipt of Bids. All bids must be received sealed in an envelope prior to the time specified in the Notice to Proposers or as amended expressly by an addendum. Late bids will not be opened and will not be considered under any circumstances.

Postponement of Opening. The County reserves the right to postpone the date and time for receiving and/or opening of proposals at any time prior to the date and time established in the Notice to Proposers.

Rejection of Proposals. The County reserves the right to reject any proposals which are incomplete, obscure, or irregular, any proposals which omit a bid on any one or more items for which bids are required; any proposals which omit unit prices if unit prices are required; any proposal in which unit prices are unbalanced in the opinion of the County; any proposals accompanied by insufficient or irregular proposal guaranty; and any proposals from contractors who have previously failed to perform properly or to complete contracts of any nature on time.

Relief of Contractors. Attention is directed to the provisions of Public Contract Code Section 5100, et seq., concerning relief of contractors, and in particular to the requirement therein that if a contractor claims a mistake was made in its bid, the contractor shall give the County written notice within five (5) calendar days after the opening of the bids of the alleged mistake, specifying in the notice, in detail, how the mistake occurred.

Bid Protest Procedures. All protesting bidders must pay a protest fee to Napa County Public Works before the protest is accepted in accordance with the Napa County Fee Policy adopted by the Board of Supervisors and last revised by Resolution 2019-70. The current Bid Protest Fee is $903.88 as set forth in Part III Fees, Part 140 Public Works, Section 140.015 and Section 140.115(f). Any bid protest must be in writing and received by the County at 1195 Third Street, Napa, CA before 5:00 p.m. no later than five (5) working days following the occurrence giving rise to the protest (the “Bid Protest Deadline”) shall be considered pursuant to the procedures set forth in Section 10 of the County Purchasing Manual and must comply with the provisions of that Section and those requirements set forth below:

(1) Only a contractor who has actually submitted a Bid Proposal is eligible to submit a bid protest against another contractor. Subcontractors are not eligible to submit bid protests. A
contractor may not rely on the bid protest submitted by another contractor, but must timely pursue its own protest.

(2) The bid protest must contain a complete statement of the basis for the protest and all supporting documentation. Material submitted after the Bid Protest Deadline will not be considered. The protest must refer to the specific portion or portions of the Contract Documents upon which the protest is based. The protest must include the name, address and telephone number of the person representing the protesting contractor if different from the protesting contractor.

(3) The party filing the protest shall concurrently transmit a copy of the protest and all supporting documents by fax or by e-mail, by or before the Bid Protest Deadline, to the protested contractor and any other contractor who has a reasonable prospect of receiving an award depending upon the outcome of the protest.

(4) The protested contractor may submit a written response to the protest, provided the response is received by the County before 5:00 p.m., within two (2) working days after the Bid Protest Deadline or after receipt of the bid protest, whichever is sooner (the “Response Deadline”). The response must include all supporting documentation. Material submitted after the Response Deadline will not be considered. The response must include the name, address and telephone number of the person representing the protested contractor if different from the protested contractor.

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

It is the intention of the County to award a contract, if at all, to the lowest contractor who demonstrates the attributes of trustworthiness, as well as quality, fitness (including financial qualifications), capacity and experience to enable it to prosecute the work successfully and properly, and to complete the work within the time period named in the Contract Documents.

To determine responsibility, the County will weigh any evidence that the contractor has performed satisfactorily other contracts of like nature and magnitude, and comparable difficulty and rates of progress, to the Work. The County shall have sole discretion to determine what contracts are of like nature and magnitude, and comparable difficulty and rates of progress.

///
NONCOLLUSION DECLARATION TO BE EXECUTED
BY CONTRACTOR AND SUBMITTED WITH BID

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

I certify and declare under penalty of perjury that the foregoing is true and correct.

Executed on ______________________ at _______________________
(DATE) (PLACE)

___________________________________
SIGNATURE
Accompanying this proposal in an amount equal to at least ten percent (10%) of the total bid is a:

- [ ] Cashier’s Check
- [ ] Certified Check
- [ ] Bidders Bond

[Note: A personal check is not an acceptable form of security]

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

IMPORTANT NOTICE: If bidder or other interested person is a corporation, state legal name of corporation, also names of the president, secretary, treasurer and manager thereof; if a copartnership, state true name of firm, also names of all individual copartners comprising the firm; if bidder or other interested person is an individual, state first and last names in full.

___________________________________________________________

___________________________________________________________

___________________________________________________________

Licensed in accordance with an act providing for the registration of Contractors.

License No. ___________ Expiration Date ___________ Classification ___________

__________________________

Signature of bidder

NOTE; if bidder is corporation, the legal name of the corporation shall be set forth above together with the signature of the officer or officer authorized to sign contracts on behalf of the corporation; if bidder is a copartnership, the true name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts in behalf of the copartnership; and if bidder is an individual, his signature shall be placed above. If signature is by an agent other than an officer of a corporation or a member of a partnership, a Power of Attorney must be on file with the County prior to opening bids or submitted with the bid; otherwise, the bid will be disregarded as irregular and unauthorized.

Business Address ________________________________________________

Place of Residence _______________________________________________

Dated _____________, 2020  Phone ________________________________

Email __________________________________________________________
SITE VISIT AFFIDAVIT

TO BE EXECUTED BY BIDDER, NOTARIZED AND SUBMITTED WITH BID

(To Accompany Bid)

State of California )
       ) ss.
County of )

____________________________, being first duly sworn, deposes and says that he/she is

____________________________, of ____________________________, (Contractor’s name)

the party making the foregoing bid, has visited the Site of Work as described in the Contract and has
examined and familiarized themselves with the existing conditions, as well as all other conditions
relating to the construction which will be performed. The submission of a bid shall be considered an
acknowledgement on the part of the bidder of familiarity with conditions at the site of Work. The Bidder
further acknowledges that the site examination has provided adequate and sufficient information related
to existing conditions which may affect cost, progress, or performance of the Work.

____________________________  ______________________________
Signature                  Name of Bidder

____________________________  ______________________________
Title                      Date
ADDENDUM ACKNOWLEDGEMENT

Bidder acknowledges receipt of the following addendums which are attached to the proposal:

Addendum No. ________________  Date ________________
Addendum No. ________________  Date ________________
Addendum No. ________________  Date ________________
Addendum No. ________________  Date ________________
Addendum No. ________________  Date ________________
Addendum No. ________________  Date ________________
Addendum No. ________________  Date ________________
Addendum No. ________________  Date ________________
LIST OF SUBCONTRACTORS

Pursuant to Section 4100 to 4113 of the Public Contract Code, Section 5-1.13 of the Standard Specifications, and Resolution 74-3 of the Napa County Board of Supervisors, each bidder shall complete and submit this form with his bid in accordance with the following instructions.

1. For each subcontract item to be performed by a subcontractor, the following shall be indicated herein: the name of the subcontractor, the portion of work to be performed, each subcontractors license number, and the location of the place of business.

2. Only one subcontractor shall be listed for each craft unless there is an alternate bid in which case a different subcontractor, when so designated, may be listed for the alternate work.

3. All fields must be completed as specified or the bid proposal may be rejected as non-responsive.

<table>
<thead>
<tr>
<th>Name of Subcontractor</th>
<th>Portion of Contract (i.e. Electrical, Striping, Roofing, etc.)</th>
<th>Subcontractor License Number</th>
<th>DIR Registration Number¹</th>
<th>Dollar Amount of Work to Be Performed</th>
<th>Location of Business (City and State)</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

¹All general contractors and subcontractors must be registered with DIR in conformance with Labor Code Section 1725.5 and 1771.1. By requesting the DIR registration numbers of all subcontractors, bidders are put on notice that if they list a subcontractor without a DIR registration number at the time of bid opening, the County, in its sole discretion, may find the failure intentional and find the bid non-responsive. DIR registration number lookup is available online at https://cadir.secure.force.com/ContractorSearch
Note: Bid Bonds to be on this form or on a form supplied by a licensed surety insurer

CONTRACTORS BOND
NAPA COUNTY
STATE OF CALIFORNIA

KNOW ALL PERSONS BY THESE PRESENTS,

That we __________________________________________________________________________________

___________________________________________________________________________________________ as PRINCIPAL, and

___________________________________________________________________________________________ as SURETY,

are held and firmly bound unto NAPA COUNTY, hereinafter called the COUNTY, in the penal sum of TEN PERCENT (10%) OF THE TOTAL AMOUNT OF THE BID of the Principal above named, submitted by said Principal to the Napa County Board of Supervisors, for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents. In no case shall the liability of the surety hereunder exceed the sum of $ __________________________________________________________________________________

THE CONDITION OF THIS OBLIGATION IS SUCH THAT WHEREAS the Principal has submitted the above mentioned bid to the Board of Supervisors of the County of Napa for the in Napa County, in accordance with the Specifications entitled Carneros Fire Station 210, PW 20-27 and the Standard Specifications of the State of California, Department of Transportation, dated, 2018, therefore, heretofore adopted by the Napa County Board of Supervisors.

NOW THEREFORE, if the aforesaid Principal is awarded the contract and within the time and manner required under the Specifications, after the prescribed forms are presented to him for signature, enter into a written contract, in the prescribed form, in accordance with the bid, and files and two bonds with the Clerk of the Board of Supervisors, one to guarantee faithful performance and the other to guarantee payment for labor and materials, as required by law, then this obligation shall be null and void; otherwise, it shall be and remain in full force and virtue.
In the event suit is brought upon this bond by the Obligee and judgment is recovered, the surety shall pay all cost incurred by the obligee in such suit, including a reasonable attorney's fee to be fixed by the court.

SEALED with our seals and dated this ___ day of ____________________________, ______.

Principal (contractor): ____________________________
By: ____________________________________________
By: ____________________________________________

Surety: ____________________________
By: ____________________________________________
, Attorney in Fact

Signatures for Principal and Surety must be acknowledged before a Notary Public

APPROVED AS TO FORM:
JEFFREY M. BRAX, Napa County Counsel

By: ____________________________________________
Deputy County Counsel
KNOW ALL PERSONS BY THESE PRESENTS THAT WE, _______________________________ as Principal, and _______________________________ as Surety, jointly and severally held and firmly bound unto NAPA COUNTY, a political subdivision of the State of California, as Obligee, in the full and just sum of $________ AND /100 DOLLARS lawful money of the United States of America, to be paid to the said Obligee, successors or assigns; for which payment, well and truly to be made, we bind ourselves, our heirs, executors, successors, administrators and assigns, jointly and severally, firmly by these presents.

THE CONDITION of the foregoing obligation is such that; whereas, the above bounden Principal has entered into a contract, or is about to enter into a contract with the Obligee to do and perform the following work, to-wit: Carneros Fire Station 210, PW 20-27 as is more specifically set forth in said contract, to which contract reference is hereby made.

NOW, THEREFORE, if the said Principal shall well and truly do the said work, and fulfill each and every of the covenants, conditions and requirements of the said contract in accordance with the plans and specifications, then the above obligation shall be null and void, otherwise it shall remain in full force and effect.

THE SURETY does hereby consent to any and all alterations, modifications and revisions to the agreement secured by this bond including but not limited to, any extension of time for performance or modifications in manner of performance which may be agreed upon and between NAPA COUNTY as Obligee and the Principal, and the Surety does hereby waive notice of any alterations, modifications, revisions, or extensions.

SEALED with our seals and dated this __________ day of __________________________, 2021.

Principal (contractor):
By: _____________________________________________________________
By: _____________________________________________________________, Attorney in Fact

Surety:
By: _____________________________________________________________

Signatures for Principal and Surety must be acknowledged before Notary Public

APPROVED AS TO FORM:
JEFFREY M. BRAX, Napa County Counsel

By: _____________________________________________________________
Deputy County Counsel

PERFORMANCE BOND
B-1
KNOW ALL PERSONS BY THESE PRESENTS THAT WE, _____________________________________________, as Principal, and _____________________________________________, as Surety, are duly authorized under the laws of the State of California to become sole surety on bonds and undertakings, as Surety, are held and firmly bound unto any and all materialsmen, persons, companies or corporations furnishing materials, provisions, provender or other supplies used in, upon, for or about the performance of the work contracted to be executed or performed under the contract hereinafter mentioned, and all persons, companies or corporations renting or hiring teams, or implements or machinery, for or contributing to said work to be done, and all persons who performed work or labor upon the same, and whose claim has not been paid by the contractor, company or corporation, in the just and full sum of _____________________________________________ AN D 1/100 DOLLARS for the payment whereof, well and truly to be made, said Principal and Surety bind themselves, their heirs, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION of the foregoing obligation is such that; whereas the above bounden principal has entered into a contract, or is about to enter into a contract with NAPA COUNTY, a political subdivision of the State of California, to do and perform the following work, to-wit: Carneros Fire Station 210, PW 20-27.

NOW THEREFORE, if the above bounden Principal, contractor, person, company or corporation, or his or its subcontractor fails to pay for any materials, provisions, provender, other supplies, or terms used in, upon for or about the performance of the work contracted to be done, or for any work or labor done thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to such work or labor, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of the Principal or the subcontractors of the Principal pursuant to Section 13020 of the Unemployment Insurance Code with respect to the work and labor, then the Surety of this bond will pay the same, in an amount not exceeding the sum specified in this bond as well as a reasonable attorney’s fee, which shall be fixed and awarded by the court to the prevailing party in said suit, said attorney’s fee to be taxed as costs in said suit and to be included in the judgment therein rendered.

THE SURETY does hereby consent to any and all alterations, modifications and revisions to the contract above referred to, and work and labor under which is secured by this bond, including but not limited to, any extension of time for performance or modifications in manner of performance which may be agreed upon by and between NAPA COUNTY and the Principal, and the Surety does hereby waive notice of any alterations, modifications, revisions, or extensions.

THIS BOND is executed and filed to comply with the provisions of the act of Legislature of the State of California as designated in Civil Code 9550 et seq., inclusive, and all amendments thereto and shall inure to the benefit of any of the persons named in Civil Code section 9100 so as to give a right of action to those person or their assigns in any suit brought upon the bond.

SEALED with our seals and dated this __________ day of ____________________________ 2021.

Principal (contractor):
By: ________________________________
By: ________________________________ Attorney in Fact

Surety:
By: ________________________________

Signatures for Principal and Surety must be acknowledged before Notary Public

APPROVED AS TO FORM:
JEFFREY M. BRAX, Napa County Counsel
By: ________________________________
Deputy County Counsel
NAPA COUNTY
STATE OF CALIFORNIA

CONTRACT FOR CONSTRUCTION

THIS AGREEMENT, made and concluded in triplicate this _____ day of __________, 2021 by
and between NAPA COUNTY, a political subdivision of the State of California, hereinafter referred to as
“COUNTY”, acting by and through its Director of Public Works, and __________________
whose mailing address is ___________________________ hereinafter referred to as “CONTRACTOR”;

TERMS

ARTICLE I. In consideration of the payments and covenants hereinafter mentioned, to be
made and performed by County, and under the conditions expressed in the two (2) bonds attached hereto,
Contractor shall, at Contractor’s own cost and expense, do all the work and furnish all materials, except
such as are specified herein to be furnished by County, necessary to construct and complete in a good,
workmanlike and substantial manner and to the satisfaction of the Napa County Board of Supervisors that
project known as CARNEROS FIRE STATION 210, PW 20-27, which shall be constructed in the County of
Napa, California, in accordance with the Plans and Specifications (“Plans”) entitled CARNEROS FIRE
STATION 210, PW 20-27, the Bid submitted by Contractor (“Bid Proposal”), the Special Provisions, and
the 2018 Standard Specifications of the State of California Department of Transportation (“Standard
Specifications”). The Plans, Bid Proposal, Special Provisions, and Standard Specifications are hereby
incorporated by reference as if set forth herein.

ARTICLE II. County hereby promises and agrees with Contractor to employ, and does hereby
employ, Contractor to provide the materials and to do the work according to the terms and conditions
herein contained for the prices hereinafter set forth, and hereby contracts to pay the same at the time, in
the manner, and upon the conditions set forth herein, and both parties hereby agree, for themselves, their
heirs, executors, administrators, successors and assigns, to full performance of the covenants contained
herein.

ARTICLE III. It is further expressly agreed by and between the parties that if there is any
conflict between the Bid Proposal of Contractor and any of the other terms of this Contract, then such
other terms shall control and any such conflicting terms of the Bid Proposal shall not be deemed to
have been accepted by County.

ARTICLE IV. Contractor agrees to receive and accept the following prices as full compensation
for furnishing all materials and for doing all the work contemplated and embraced in this Contract; for all
loss and damage, arising out of the nature of such work, from the action of the elements, or from any
unforeseen difficulties or obstructions which may arise or be encountered in the prosecution of the work
until its acceptance by the Board of Supervisors of the County, acting by and through its Director of
Public Works, and for all risks of every description connected with the work except as prohibited by law;
for all expenses incurred by or in consequence of the suspension or discontinuance of work; and for well
and faithfully completing the work and the whole thereof in the manner and according to the Plans,
Special Provisions, and Standard Specifications and the requirements of the Engineer under them, to wit:

///
<table>
<thead>
<tr>
<th>Item No.</th>
<th>Item Description</th>
<th>Units</th>
<th>Qty</th>
<th>Total</th>
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<tbody>
<tr>
<td>1</td>
<td>Mobilization</td>
<td>LS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Demolition</td>
<td>LS</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Site Grading</td>
<td>LS</td>
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<td></td>
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<tr>
<td>4</td>
<td>Pre-Engineered Structure</td>
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<td>5</td>
<td>Concrete</td>
<td>LS</td>
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</tr>
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<td>Paving</td>
<td>LS</td>
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<tr>
<td>7</td>
<td>Surveying</td>
<td>LS</td>
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</tbody>
</table>

**Total Base Bid**

**TOTAL BASE BID:** $________________________

**TOTAL BASE BID:** (Written Number) __________________________

_______________________________________________________________

/100 DOLLARS

**Note:** Lowest bid is determined from Total Base Bid and does not include additive alternate in determination.

<table>
<thead>
<tr>
<th>Additive Alternates</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Backup Generator</td>
<td>LS</td>
<td>1</td>
</tr>
<tr>
<td>2 Monument Sign with Lighting</td>
<td>LS</td>
<td>1</td>
</tr>
<tr>
<td>3 Hose Drying Rack</td>
<td>LS</td>
<td>1</td>
</tr>
<tr>
<td>4 Ground Mounted 25’ Flag Pole with Lighting</td>
<td>LS</td>
<td>1</td>
</tr>
<tr>
<td>5 Fire Suppression System with Fire Alarm</td>
<td>LS</td>
<td>1</td>
</tr>
<tr>
<td>6 Storefront Window</td>
<td>LS</td>
<td>1</td>
</tr>
<tr>
<td>7 Cast Aluminum Building Identifications Letters, 9’ High, Mounted to face of wall Panels</td>
<td>LS</td>
<td>1</td>
</tr>
<tr>
<td>8 Aluminum Sectional Overhead Door in lieu of Steel Sectional Overhead Door</td>
<td>LS</td>
<td>1</td>
</tr>
<tr>
<td>9 Driveway Site Lighting at West Property Edge</td>
<td>LS</td>
<td>1</td>
</tr>
</tbody>
</table>

Subtotal

///

///

///
IN WITNESS WHEREOF, this Contract has been approved by County and Contractor as of the date first set forth on page C-1 of this Contract.

NAPA COUNTY, a political subdivision of the State of California

By________________________________________
ALFREDO PEDROZA, Chair
Board of Supervisors
“COUNTY”

BUSINESS NAME OF CONTRACTOR

By________________________________________
Authorized Signature NAME, Title

By________________________________________
Authorized Signature NAME, Title
“CONTRACTOR”

<table>
<thead>
<tr>
<th>APPROVED AS TO FORM</th>
<th>APPROVED BY THE NAPA COUNTY BOARD OF SUPERVISORS</th>
<th>ATTEST: ____________________________</th>
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<tbody>
<tr>
<td>Office of County Counsel</td>
<td>Date: ____________________________</td>
<td>Clerk of the Board of Supervisors</td>
</tr>
<tr>
<td>By: ____________________________</td>
<td>Processed By: __________________________</td>
<td>By: ____________________________</td>
</tr>
<tr>
<td>Deputy County Counsel</td>
<td>Deputy Clerk of the Board</td>
<td></td>
</tr>
<tr>
<td>Date: ____________________________</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE: Signature of those executing for the Contractor must be acknowledged by Notary Public. If a corporation, this document must be signed by two corporate officers. The first signature must be either the Chairman of the Board, President, or any Vice President. The second signature must be the Secretary, an Assistant Secretary, the Chief Financial Officer, or any Assistant Treasurer. In the alternative, a single corporate signature is acceptable when accompanied by a corporate document demonstrating the legal authority of the signature to bind the company.
Carneros Fire Station 210, PW 20-27

SPECIAL PROVISIONS
SECTION A - GENERAL CONDITIONS

1. LOCATION
5260 Old Sonoma Road, Napa CA 94559

2. DESCRIPTION OF WORK
Work generally consist of, but is not limited to, all labor and materials for the site preparation and construction of a new 1,860 square foot pre-engineering steel volunteer fire station building, site paving, sidewalks, asphalt parking, and driveway approach on a currently undeveloped lot. Construction consists of all labor and materials as indicated in Contract Documents.

3. DEFINITIONS AND TERMS
As used herein, unless the context otherwise requires, the following terms have the following meaning:

Contractor. The successful Bidder whose Bid Proposal is accepted by the Board of Supervisors of the County of Napa or the Public Works Director and to whom the Contract is awarded.

County. Napa County, a political subdivision of the State of California.

Department of Transportation. The Napa County Board of Supervisors.

Department. The Napa County Department of Public Works.

Director of Transportation. The Napa County Public Works Director.

Engineer or County Engineer. The Napa County Public Works Director, acting either directly or through properly authorized agents, such agents acting within the scope of the particular duties entrusted to them.

Laboratory. The established laboratory of the Materials and Research Department of Transportation of the State of California or laboratories authorized by the Engineer to test materials and work involved in the contract.

Owner. Napa County.

State of California. Napa County.
Transportation Building, Sacramento. Room 101, Administration Building, 1195 Third Street, Napa, California 94559.

State Highway Engineer. The County Engineer.

Standard Specifications. The 2018 edition of the Standard Specifications of the State of California, Department of Transportation. Any reference therein to the State of California or a State agency, office or officer shall be interpreted to refer to the County or its corresponding agency, office or officer acting under this contract.

4. CONTRACT DOCUMENTS

The Contract Documents shall include the Standard Specifications of the State of California, Department of Transportation, dated 2018, insofar as same may apply, the Special Provisions, the Notice to Contractors, the Proposal, the Contract (“C”) pages, the two contract bonds required herein, any supplemental agreements amending or extending the work, and pertinent portions of other documents included by reference thereto in the Special Provisions or the Contract pages.

5. TIME OF COMPLETION

Attention is directed to all of the provisions of Section 8, “Prosecution and Progress,” of the Standard Specifications and these Special Provisions. The Contractor shall begin work upon receiving notice that the contract has been executed and approved and shall diligently prosecute the same to completion before the expiration of One hundred (100) working days from the start of work.

6. LIQUIDATED DAMAGES

Attention is directed to the provisions of Section 8-1.10 of the Standard Specifications. The Contractor shall pay to County the sum of $3,000 per day for each and every calendar day delay in finishing the work in excess of the number of working days prescribed above and any extension of time granted.

7. SPECIALTY EXTRA WORK

Attention is directed to Section 9-1.05 of the Standard Specifications.

8. PREVAILING WAGES

In accordance with the provisions of Section 1774 of the Labor Code of the State of California, the Board of Supervisors of the County of Napa has ascertained from the Director of Industrial Relations the general prevailing rate of wages (which rate includes employer payments for health and welfare, pension, vacation and similar purposes) applicable to the work to be done. These rates of wages are on file and may be seen at the County of Napa, Department of Public Works, 1195 Third Street, Room 101, Napa, California.
9. **PAYROLL RECORDS**

Special Attention is directed to the provisions of Section 7-1.02K(3) of the Standard Specifications. A copy of all payrolls shall be submitted weekly to the Engineer. Payrolls shall contain the full name, address and social security number of each employee, his correct classification, rate of pay, daily and weekly number of hours worked, itemized deductions made and actual wages paid. They shall also indicate apprentices and ratio of apprentices to journeymen. The employee’s address and social security number need only appear on the first payroll on which his name appears. The payroll shall be accompanied by a "Statement of Compliance" signed by the employer or his agent indicating that the payrolls are correct and complete and that the wage rates contained therein are not less than those required by the contract. The "Statement of Compliance" shall be on forms furnished by the Department or on any form with identical wording. The Contractor shall be responsible for the submission of copies of payrolls of all subcontractors.

**Access to Records/Retention.** COUNTY, any federal or state grantor agency funding all or part of the compensation payable hereunder, the State Controller, the Secretary General of the United States, or the duly authorized representatives of any of the above, shall have access to any books, documents, papers and records of CONTRACTOR which are directly pertinent to the subject matter of this Contract for the purpose of making audit, examination, excerpts and transcriptions. Original records shall be forwarded to the COUNTY after Contract completion or retained for a period of 6 years after Contract completion.

10. **PROPOSAL REQUIREMENTS AND CONDITIONS**

Attention is directed to Section 2 of the Standard Specifications.

(a) **Examination of Site.** Each bidder shall have examined the site of the work before bidding so he shall have full knowledge of all facilities and difficulties affecting the work which may not be particularly described herein. No variation or allowance from the contract sum will be made because of lack of such examination or knowledge.

(b) **State Contract Act.** The State Contract Act is not applicable to contracts involving political subdivisions of the State of California. Pre-qualification of bidders will not be required.

(c) **Joint Venture.** If two or more Bidders desire to bid jointly on a single project or desire to combine their assets for so doing, they must file an affidavit of joint venture with the County Engineer at least 5 working days before the scheduled bid opening, and if approved, such affidavit of joint venture will be valid only for the specific project for which it is filed. If such affidavit of joint venture is not filed as aforesaid and approved by the Engineer prior to the time for opening bids on the specific projects for which it is submitted, a joint bid submitted by the said Bidders will be disregarded.

(d) **Registered and Qualified – California Labor Code § 1771.1.** A contractor or subcontractor shall not be qualified to bid on, be listed in a bid proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of
any contract for public work, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Section 1725.5. It is not a violation of this section for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

11. **AWARD AND EXECUTION OF THE CONTRACT**
Attention is directed to Section 3 of the Standard Specifications, contract bonds. In-lieu of the bonds specified under Section 3.1.05 of the Standard Specifications, the successful bidder shall furnish a faithful Performance Bond as required by Section 20129 of the Public Contract Code in an amount equal to one hundred percent (100%) of the contract price of the work contemplated and the laborer's and material man's payment bond as required by Section 9550 of the Civil Code in an amount equal to one hundred percent (100%) of the contract price of the work contemplated. The bonds shall be issued by one or more surety companies acceptable to the County and the Agencies.

12. **SCOPE OF WORK**
Attention is directed to Section 4 of the Standard Specifications.

The intent of the Plans and Specifications is to cover the complete project ready for use when completed. The Contractor shall accomplish complete installation of facilities, and any other required items to make the unit complete. All units, facilities, etc., shall be in operating condition to the approval of the Engineer. The quantities and items listed in the proposal form and contract form are given as a basis for the comparison of bids and the Board of Supervisors does not, expressly or by implication, agree that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the amount of any class or portion of the work, or to omit portions of the work as may be deemed necessary or expedient by the Engineer.

13. **CHANGE ORDERS**

(a) **Limitations Where Contract Price Changes are Involved.**

i. **Overhead and Profit for the Contractor.** The Contractor's overhead and profit on the cost of subcontracts shall be a sum not exceeding ten percent (10%) of such costs. The Contractor's overhead and profit on the costs of work performed by the Contractor shall be a sum not exceeding fifteen percent (15%) of such costs. Overhead and profit shall not be applied to the cost of taxes and insurance by Contractor or Subcontractors or to credits. No processing or similar fees may be charged by the Contractor in connection with the Modification.

ii. **Bond Premiums.** The actual rate of bond premiums as paid on the total cost (including taxes) will be allowed, but with no markup for profit and overhead.
iii. **Taxes.** State and city sales taxes should be indicated.

(b) **Procedure.** Attention is directed to Section 4.05 of the Standard Specifications.

(c) **Authorized Representative / Limits.** No Change Order shall be valid or binding against COUNTY unless such Change Order has been executed in writing by (1) COUNTY’s Director of Public Works consistent with the authority granted to him by the Board of Supervisors pursuant to the limitations set forth under Napa County Resolution No. 2011-18 and Public Contract Code Section 20142, or (2) by the Board of Supervisors.

14. **CONTROL OF THE WORK**

Attention is directed to Section 5 of the Standard Specifications.

Deviations from the approved Plans and Specifications shall be approved by the Engineer and all changes shall be by written permission only.

15. **LEGAL RELATION AND RESPONSIBILITY**

Attention is directed to Section 7 of the Standard Specifications.

(a) **Prevailing Wages.** In-lieu of the prevailing wage rates being set forth in the Notice to Contractors as provided in Standard Specifications Section 7-1.02K(2) "Prevailing Wages", see Section 8 and 9 of these Special Provisions.

(b) **Public Safety.** Furnishing and maintenance of barricades, flashing lights and other safety devices shall be the responsibility of the Contractor at all times. The Contractor shall respond promptly to correct improper conditions or inoperative devices.

Failure to frequently inspect and maintain lights and barricades in proper operating condition when in use on the roadway, or failure to respond promptly to notification of improperly operating equipment, will be sufficient cause for suspension of the contract until such defects are corrected.

All expenses incurred by the County because of emergency "call-outs" and for resetting or supplementing the Contractor's barricades or warning devices, will be charged to the contractor and may be deducted from moneys due him.

(c) **Acceptance of Contract.** Attention is directed to Section 7-1.17 of the Standard Specifications. Acceptance will consist of the execution and filing with the County Recorder of a Notice of Completion in accordance with Civil Code section 9204.

Should it become necessary due to developed conditions to occupy any portion of the work before the contract is fully completed, such occupancy shall not constitute acceptance.
(d) **Hold Harmless/Indemnification.** To the full extent permitted by law, CONTRACTOR shall hold harmless, defend at its own expense, and indemnify COUNTY and the officers, agents, employees and volunteers of COUNTY, and project funding agencies from any and all liability, claims, losses, damages or expenses, including reasonable attorney’s fees, for personal injury (including death) or damage to property, arising from all acts or omissions to act of CONTRACTOR or its officers, agents, employees, volunteers, contractors and subcontractors in rendering services under this Agreement, excluding, however, such liability, claims, losses, damages or expenses arising from the active or sole negligence or willful misconduct of COUNTY or its officers, agents, employees or volunteers. Each party shall notify the other party immediately in writing of any claim or damage related to activities performed under this Agreement. The parties shall cooperate with each other in the investigation and disposition of any claim arising out of the activities under this Agreement, providing that nothing shall require either party to disclose any documents, records or communications that are protected under peer review privilege, attorney-client privilege, or attorney work product privilege.

(e) **Insurance.** CONTRACTOR shall obtain and maintain in full force and effect throughout the term of this Agreement, and thereafter as to matters occurring during the term of this Agreement, the following insurance coverage:

1. **Workers’ Compensation insurance.** If and to the extent required by law during the term of this Agreement, CONTRACTOR shall provide workers’ compensation insurance for the performance of any of CONTRACTOR’s duties under this Agreement; including but not limited to, coverage for workers’ compensation, employer’s liability and a waiver of subrogation, and shall provide COUNTY with certification of all such coverages upon request by COUNTY’s Risk Manager.

2. **Liability Insurance.** CONTRACTOR shall obtain and maintain in full force and effect during the term of this Agreement the following liability insurance coverages, issued by a company admitted to do business in California and having an A.M. Best rating of A VII or better or equivalent self-insurance:

   (i) **General Liability.** Commercial general liability [CGL] insurance coverage (personal injury and property damage) of not less than **ONE MILLION DOLLARS ($1,000,000)** combined single limit per occurrence, covering liability or claims for any personal injury, including death, to any person and/or damage to the property of any person arising from the acts or omissions of CONTRACTOR or any officer, agent, or employee of CONTRACTOR under this Agreement. If the coverage includes an aggregate limit, the aggregate limit shall be no less than twice the occurrence limit.

   (ii) **Professional Liability/Errors and Omissions.** RESERVED

   (iii) **Comprehensive Automobile Liability Insurance.** Comprehensive automobile liability insurance (Bodily Injury and Property Damage) on owned, hired, leased and non-owned vehicles used in conjunction with CONTRACTOR's business of not less than **ONE MILLION DOLLARS ($1,000,000)** combined single limit per occurrence. If the coverage includes an aggregate limit, the aggregate limit shall be no less than twice the occurrence limit.
(3) Certificates. All insurance coverages referenced in (2), above, shall be evidenced by one or more certificates of coverage or, with the consent of COUNTY’s Risk Manager demonstrated by other evidence of coverage acceptable to COUNTY’s Risk Manager, which shall be filed by CONTRACTOR with the DEPARTMENT OF PUBLIC WORKS prior to commencement of performance of any of Contractor’s duties.

(i) The certificate(s) or other evidence of coverage shall reference this Agreement by its COUNTY number or title and department; shall be kept current during the term of this Agreement; shall provide that COUNTY shall be given no less than thirty (30) days prior written notice of any non-renewal, cancellation, other termination, or material change, except that only ten (10) days prior written notice shall be required where the cause of non-renewal or cancellation is non-payment of premium; and shall provide that the inclusion of more than one insured shall not operate to impair the rights of one insured against another insured, the coverage afforded applying as though separate policies had been issued to each insured, but the inclusion of more than one insured shall not operate to increase the limits of the company’s liability.

(ii) Waiver of Subrogation and Additional Insured Endorsements. For the commercial general liability insurance coverage referenced in 2(i) and, for the comprehensive automobile liability insurance coverage referenced in 2(iii) where the vehicles are covered by a commercial policy rather than a personal policy, CONTRACTOR shall also file with the evidence of coverage an endorsement from the insurance provider naming COUNTY, its officers, employees, agents and volunteers as additional insureds and waiving subrogation. For the Workers Compensation insurance coverage, CONTRACTOR shall file with the evidence of coverage an endorsement waiving subrogation.

(iii) The certificate or other evidence of coverage shall provide that if the same policy applies to activities of CONTRACTOR not covered by this Agreement, then the limits in the applicable certificate relating to the additional insured coverage of COUNTY shall pertain only to liability for activities of CONTRACTOR under this Agreement, and that the insurance provided is primary coverage to COUNTY with respect to any insurance or self-insurance programs maintained by COUNTY. The additional insured endorsements for the general liability coverage shall use Insurance Services Office (ISO) Form No. CG 20 09 11 85 or CG 20 10 11 85, or equivalent, including (if used together) CG 2010 10 01 and CG 2037 10 01; but shall not use the following forms: CG 20 10 10 93 or 03 94.

(iv) Upon request by COUNTY’s Risk Manager, CONTRACTOR shall provide or arrange for the insurer to provide within thirty (30) days of the request, certified copies of the actual insurance policies or relevant portions thereof.

(4) Deductibles/Retentions. Any deductibles or self-insured retentions shall be declared to, and be approved by, COUNTY’s Risk Manager, which approval shall not be denied unless the COUNTY’s Risk Manager determines that the deductibles or self-insured retentions are unreasonably large in relation to compensation payable under this Agreement and the risks of liability associated with the activities required of CONTRACTOR by this Agreement. At the option of and upon request by COUNTY’s Risk Manager if the Risk Manager determines that such deductibles or retentions are unreasonably high, either the insurer shall reduce or eliminate such deductibles or self-
insurance retentions as respects COUNTY, its officers, employees, agents, and volunteers or Contractor shall procure a bond guaranteeing payment of losses and related investigations, claims administration, and defense expenses.

(i) Inclusion in Subcontracts. CONTRACTOR agrees to require all subcontractors and any other entity or person who is involved in providing services under this Agreement to comply with the Workers Compensation and General Liability insurance requirements set forth in this Paragraph 15.

16. PROSECUTION AND PROGRESS

Attention is directed to Section 8 of the Standard Specifications, and to the following:

(a) Progress Schedule. The contractor, promptly after being awarded the contract, shall prepare and submit for the Owner’s and Engineer’s information a Contractor’s construction schedule for the work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the work and project or when requested in writing by the Engineer, shall be related to the entire project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the work.

(b) Schedule Of Submittals. The Contractor shall prepare and keep current, for the Engineer’s approval, a schedule of submittals which is coordinated with the Contractor’s construction schedule and allows the Engineer reasonable time to review submittals.

(c) Current Progress Schedule. The Contractor shall perform the work in general accordance with the most recent schedules submitted to the Owner and Engineer.

(d) Termination of Contract. In-lieu of the provisions of Section 8-1.13 of the Standard Specifications the following shall apply.

Whenever, in the opinion of the Board of Supervisors the said work is neglected by the Contractor, or the same is not prosecuted with the diligence and force specified, meant and intended in and by the terms of this contract, it shall be lawful for the Board of Supervisors to make a requisition upon the Contractor for such additional specific force or such additional specific material to be brought into the work under this contract or to remove improper material from the grounds, and its due and faithful fulfillment requires; of which action of the Board of Supervisors due notice in writing of not less than five days shall be served upon the Contractor or his agent having charge of the work.

Upon the completion of such work, the said Board of Supervisors through its proper office or officers shall cause a statement to be made of the default of the Contractor as aforesaid, and in completing the work itself or by any other person or persons. Should the amount in such statement be more than the amount would have been due the Contractor upon the completion of the work by him, the difference shall be paid by the Contractor to the County of Napa.
17. **TERMINATION FOR CONVENIENCE OF THE COUNTY**

Notwithstanding any other provision of this AGREEMENT, COUNTY may, at any time, and without cause, terminate this AGREEMENT in whole or in part, upon not less than seven (7) days' written notice to CONTRACTOR. Such termination shall be effected by delivery to CONTRACTOR of a notice of termination specifying the effective date of the termination and the extent of the work to be terminated. CONTRACTOR shall immediately stop work in accordance with the notice and comply with any other direction as may be specified in the notice or as provided subsequently by COUNTY. COUNTY shall pay CONTRACTOR for the work completed prior to the effective date of the termination, and such payment shall be CONTRACTOR's sole remedy under this AGREEMENT. Under no circumstances will CONTRACTOR be entitled to anticipatory or unearned profits, consequential damages, or other damages of any sort as a result of a termination or partial termination under this paragraph. CONTRACTOR shall insert in all subcontracts that the subcontractor shall stop work on the date of and to the extent specified in a notice of termination, and shall require subcontractors to insert the same condition in any lower tier subcontracts.

18. **MEASUREMENT AND PAYMENT**

Attention is directed to Section 9 of the Standard Specifications.

(a) **Force Account Payment.** In connection with Section 9-1.04D "Equipment Rental", the following shall apply:

   Equipment rental rates shall be those rental rates applicable on contracts advertised by the State of California, Department of Transportation on the date of call for bids on this contract.

(b) **Partial payment.** In lieu of Section 9-1.06E, of the Standard Specifications the County will retain five percent (5%) of the value of all work done and five percent (5%) of the value of the materials so estimated to have been furnished and delivered and unused or furnished and stored as aforesaid as part security for the fulfillment of the contract by the Contractor to the extent not inconsistent with Public Contract Code Section 20104.50; all such retentions being subject to the following statutory requirements:

   **Public Contract Code Section 7107. Retention proceeds; withholding disbursement**

   (a) This section is applicable with respect to all contracts entered into on or after January 1, 1993 relating to the construction of any public work of improvement.

   (b) The retention proceeds withheld from any payment by the public entity from the original contractor, or by the original contractor from any subcontractor, shall be subject to this section.

   (c) Within 60 days after the date of completion of the work of improvement, the retention withheld by the public entity shall be released. In the event of a dispute between the public entity and the original contractor, the public entity may withhold from the final payment an amount not to exceed 150 percent of the disputed amount. For purposes of this subdivision, "completion" means any of the following:
(1) The occupation, beneficial use, and enjoyment of a work of improvement, excluding any operation only for testing, startup, or commissioning, by the public agency, or its agent, accompanied by cessation of labor on the work of improvement.

(2) The acceptance by the public agency, or its agent, of the work of improvement.

(3) After the commencement of a work of improvement, a cessation of labor on the work of improvement for a continuous period of 100 days or more, due to factors beyond the control of the contractor.

(4) After the commencement of a work of improvement, a cessation of labor on the work of improvement for a continuous period of 30 days or more, if the public agency files for record a notice of cessation or a notice of completion.

(d) Subject to subdivision (e), within 10 days from the time that all or any portion of the retention proceeds are received by the original contractor, the original contractor shall pay each of its subcontractors from whom retention has been withheld, each subcontractor's share of the retention received. However, if a retention payment received by the original contractor is specifically designated for a particular subcontractor, payment of the retention shall be made to the designated subcontractor, if the payment is consistent with the terms of the subcontract.

(e) The original contractor may withhold from a subcontractor its portion of the retention proceeds if a bona fide dispute exists between the subcontractor and the original contractor. The amount withheld from the retention payment shall not exceed 150 percent of the estimated value of the disputed amount.

(f) In the event that retention payments are not made within the time periods required by this section, the public entity or original contractor withholding the unpaid amounts shall be subject to a charge of 2 percent per month on the improperly withheld amount, in lieu of any interest otherwise due. Additionally, in any action for the collection of funds wrongfully withheld, the prevailing party shall be entitled to attorney's fees and costs.

(g) If a state agency retains an amount greater than 125 percent of the estimated value of the work yet to be completed pursuant to Section 10261 of the Public Contract Code, the state agency shall distribute undisputed retention proceeds in accordance with subdivision (c). However, notwithstanding subdivision (c), if a state agency retains an amount equal to or less than 125 percent of the estimated value of the work yet to be completed, the state agency shall have 90 days in which to release undisputed retentions.

(h) Any attempted waiver of the provisions of this section shall be void as against the public policy of this state.

Public Contract Code Section 22300. Performance retentions; provision for substitute security; escrow agreement

(a) Provisions shall be included in any invitation for bid and in any contract documents to permit the substitution of securities for any moneys withheld by a public agency to ensure performance under a contract; however, substitution of securities provisions shall not be required in 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. At the request and expense of the contractor, securities equivalent to the amount withheld shall be deposited with the public agency, or with a state or federally chartered bank in this state as the escrow agent, who shall then pay those moneys to the contractor. Upon satisfactory completion of the contract, the securities shall be returned to the contractor.
(b) Alternatively, the contractor may request and the owner 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 the escrow agent all securities, interest, and payments received by the escrow agent from the owner, pursuant to the terms of this section.

(c) Securities eligible for investment under this section shall include those 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 the contractor and the public agency. The contractor shall be the beneficial owner of any securities substituted for moneys withheld and shall receive any interest thereon. Failure to include these provisions in bid and contract documents shall void any provisions for performance retentions in a public agency contract. For purposes of this section, the term "public agency" shall include, but shall not be limited to, chartered cities.

(d) (1) Any contractor who elects to receive interest on moneys withheld in retention by a public agency shall, at the request of any subcontractor, make that option available to the subcontractor regarding any moneys withheld in retention by the contractor from the subcontractor. If the contractor elects to receive interest on any moneys withheld in retention by a public agency, then the subcontractor shall receive the identical rate of interest received by the contractor on any retention moneys withheld from the subcontractor by the contractor, less any actual pro rata costs associated with administering and calculating that interest. In the event that the interest rate is a fluctuating rate, the rate for the subcontractor shall be determined by calculating the interest rate paid during the time that retentions were withheld from the subcontractor. If the contractor elects to substitute securities in lieu of retention, then, by mutual consent of the contractor and subcontractor, the subcontractor may substitute securities in exchange for the release of moneys held in retention by the contractor.

(2) This subdivision shall apply only to those subcontractors performing more than five percent of the contractor's total bid.

(3) No contractor shall require any subcontractor to waive any provision of this section.

(e) The Legislature hereby declares that the provisions of this section are of statewide concern and are necessary to encourage full participation by contractors and subcontractors in public contract procedures.

(f) The escrow agreement used hereunder shall be null, void, and unenforceable unless it is substantially similar to the following form:

ESCROW AGREEMENT FOR
SECURITY DEPOSITS IN LIEU OF RETENTION

This Escrow Agreement is made and entered into by and between:

whose address is

hereinafter called "Owner;"

whose address is

hereinafter called "Contractor;" and

whose address is

hereinafter called "Escrow Agent."

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

(1) Pursuant to Section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by Owner pursuant to the Construction Contract entered into between the Owner and Contractor for __________ in the amount of __________ dated __________ (hereinafter referred to as the "Contract"). Alternatively, on written request of the Contractor, the Owner shall make payments of the retention earnings directly to the Escrow Agent. When the Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Owner within 10 days of the deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between the Owner and Contractor. Securities shall be held in the name of __________, and shall designate the Contractor as the beneficial owner.

(2) The Owner shall make progress payments to the Contractor for those funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that the Escrow Agent holds securities in the form and amount specified above.

(3) When the Owner makes payment of retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for the benefit of the Contractor until the time that the escrow created under this contract is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the 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 the Owner. These expenses and payment terms shall be determined by the Owner, Contractor, and Escrow Agent.

(5) The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the 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 the Owner to the Escrow Agent that Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.

(7) The Owner shall have a right to draw upon the securities in the event of default by the Contractor. Upon seven days' written notice to the Escrow Agent from the owner of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the Owner.

(8) Upon receipt of written notification from the Owner certifying that the Contract is final and complete, and that the 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 the written notifications from the Owner and the Contractor pursuant to Sections (5) to (8), inclusive, of this Agreement and the Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.
(10) The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Owner and on behalf of Contractor in connection with the foregoing, and exemplars of their respective signatures are as follows:

On behalf of Owner:       On behalf of Contractor:

Title
Name
Signature
Address

On behalf of Escrow Agent:

Title
Name
Signature
Address

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

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

“Owner”                       Contractor

Title
Name
Signature

Public Contract Code Section 20104.50 Timely progress payments; legislative intent; interest; payment requests

(a) (1) It is the intent of the Legislature in enacting this section to require all local governments to pay their contractors on time so that these contractors can meet their own obligations. In requiring prompt payment by all local
governments, the Legislature hereby finds and declares that the prompt payment of outstanding receipts is not merely a municipal affair, but is, instead, a matter of statewide concern.

(2) It is the intent of the Legislature in enacting this article to fully occupy the field of public policy relating to the prompt payment of local governments' outstanding receipts. The Legislature finds and declares that all government officials, including those in local government, must set a standard of prompt payment that any business in the private sector which may contract for services should look towards for guidance.

(b) Any local agency which fails to make any progress payment within 30 days after receipt of an undisputed and properly submitted payment request from a contractor on a construction contract shall pay interest to the contractor equivalent to the legal rate set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure.

(c) Upon receipt of a payment request, each local agency shall act in accordance with both of the following:

(1) Each payment request shall be reviewed by the local agency as soon as practicable after receipt for the purpose of determining that the payment request is a proper payment request.

(2) Any payment request determined not to be a proper payment request suitable for payment shall be returned to the contractor as soon as practicable, but not later than seven days, after receipt. A request returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the payment request is not proper.

(d) The number of days available to a local agency to make a payment without incurring interest pursuant to this section shall be reduced by the number of days by which a local agency exceeds the seven-day return requirement set forth in paragraph (2) of subdivision (c).

(e) For purposes of this article:

(1) A "local agency" includes, but is not limited to, a city, including a charter city, a county, and a city and county, and is any public entity subject to this part.

(2) A "progress payment" includes all payments due contractors, except that portion of the final payment designated by the contract as retention earnings.

(3) A payment request shall be considered properly executed if funds are available for payment of the payment request, and payment is not delayed due to an audit inquiry by the financial officer of the local agency.

(f) Each local agency shall require that this article, or summary thereof, be set forth in the terms of any contract subject to this article.

(c) Claims. All claims under this contract shall be subject to the Potential Claims procedures set forth in 5-1.43 of the Standard Specification and any subsequent claims that did not fail to comply with any portion of those Potential Claim procedures shall be subject to the following statutory requirements:

Public Contract Code Section 9204 Claim resolution process for claim by contractor in connection with public works project.

(a) The Legislature finds and declares that it is in the best interests of the state and its citizens to ensure that all construction business performed on a public works project in the state that is complete and not in dispute is paid in full and in a timely manner.

(b) Notwithstanding any other law, including, but not limited to, Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2, Chapter 10 (commencing with Section 19100) of Part 2, and Article 1.5 (commencing with Section 20104) of
Chapter 1 of Part 3, this section shall apply to any claim by a contractor in connection with a public works project.

(c) For purposes of this section:
(1) "Claim" means a separate demand by a contractor sent by registered mail or certified mail with return receipt requested, for one or more of the following:
   (A) A time extension, including, without limitation, for relief from damages or penalties for delay assessed by a public entity under a contract for a public works project.
   (B) Payment by the public entity of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public works project and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled.
   (C) Payment of an amount that is disputed by the public entity.

(2) "Contractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who has entered into a direct contract with a public entity for a public works project.

(3) (A) "Public entity" means, without limitation, except as provided in subparagraph (B), a state agency, department, office, division, bureau, board, or commission, the California State University, the University of California, a city, including a charter city, county, including a charter county, city and county, including a charter city and county, district, special district, public authority, political subdivision, public corporation, or nonprofit transit corporation wholly owned by a public agency and formed to carry out the purposes of the public agency.
   (B) "Public entity" shall not include the following:
      (i) The Department of Water Resources as to any project under the jurisdiction of that department.
      (ii) The Department of Transportation as to any project under the jurisdiction of that department.
      (iii) The Department of Parks and Recreation as to any project under the jurisdiction of that department.
      (iv) The Department of Corrections and Rehabilitation with respect to any project under its jurisdiction pursuant to Chapter 11 (commencing with Section 7000) of Title 7 of Part 3 of the Penal Code.
      (v) The Military Department as to any project under the jurisdiction of that department.
      (vi) The Department of General Services as to all other projects.
      (vii) The High-Speed Rail Authority.

(4) "Public works project" means the erection, construction, alteration, repair, or improvement of any public structure, building, road, or other public improvement of any kind.

(5) "Subcontractor" means any type of contractor within the meaning of Chapter 9 (commencing with Section 7000) of Division 3 of the Business and Professions Code who either is in direct contract with a contractor or is a lower tier subcontractor.

(d) (1) (A) Upon receipt of a claim pursuant to this section, the public entity to which the claim applies shall conduct a reasonable review of the claim and, within a period not to exceed 45 days, shall provide the claimant a written statement identifying what portion of the claim is disputed and what portion is undisputed. Upon receipt of a claim, a public entity and a contractor may, by mutual agreement, extend the time period provided in this subdivision.
   (B) The claimant shall furnish reasonable documentation to support the claim.
(C) If the public entity needs approval from its governing body to provide the claimant a written statement identifying the disputed portion and the undisputed portion of the claim, and the governing body does not meet within the 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 public entity shall have up to three days following the next duly publicly noticed meeting of the governing body after the 45-day period, or extension, expires to provide the claimant a written statement identifying the disputed portion and the undisputed portion.

(D) Any payment due on an undisputed portion of the claim shall be processed and made within 60 days after the public entity issues its written statement. If the public entity fails to issue a written statement, paragraph (3) shall apply.

(2) (A) If the claimant disputes the public entity's written response, or if the public entity fails to respond to a claim issued pursuant to this section within the time prescribed, the claimant 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 public entity shall schedule a meet and confer conference within 30 days for settlement of the dispute.

(B) Within 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 public entity shall provide the claimant 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 60 days after the public entity issues its written statement. Any disputed portion of the claim, as identified by the contractor in writing, shall be submitted to nonbinding mediation, with the public entity and the claimant sharing the associated costs equally. The public entity and claimant shall mutually agree to a mediator within 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. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside this section.

(C) For purposes of this section, 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 section.

(D) Unless otherwise agreed to by the public entity and the contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under Section 20104.4 to mediate after litigation has been commenced.

(E) This section does not preclude a public entity from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program, if mediation under this section does not resolve the parties' dispute.

(3) Failure by the public entity to respond to a claim from a contractor within the time periods described in this subdivision or to otherwise meet the time requirements of this section shall result in the claim being deemed rejected in its entirety. A claim that is denied by reason of the public entity's failure to have responded to a claim, or its failure to otherwise meet the time requirements of this section, shall not constitute
an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the claimant.

(4) Amounts not paid in a timely manner as required by this section shall bear interest at 7 percent per annum.

(5) If a subcontractor or a lower tier subcontractor lacks legal standing to assert a claim against a public entity because privity of contract does not exist, the contractor may present to the public entity a claim on behalf of a subcontractor or lower tier subcontractor. A subcontractor may request in writing, either on his or her own behalf or on behalf of a lower tier subcontractor, that the contractor present a claim for work which was performed by the subcontractor or 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 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 public entity and, if the original contractor did not present the claim, provide the subcontractor with a statement of the reasons for not having done so.

(e) The text of this section or a summary of it shall be set forth in the plans or specifications for any public works project that may give rise to a claim under this section.

(f) A waiver of the rights granted by this section is void and contrary to public policy, provided, however, that (1) upon receipt of a claim, the parties may mutually agree to waive, in writing, mediation and proceed directly to the commencement of a civil action or binding arbitration, as applicable; and (2) a public entity may prescribe reasonable change order, claim, and dispute resolution procedures and requirements in addition to the provisions of this section, so long as the contractual provisions do not conflict with or otherwise impair the timeframes and procedures set forth in this section.

(g) This section applies to contracts entered into on or after January 1, 2017.

(h) Nothing in this section shall impose liability upon a public entity that makes loans or grants available through a competitive application process, for the failure of an awardee to meet its contractual obligations.

(i) This section shall remain in effect only until January 1, 2020, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2020, deletes or extends that date.

Public Contract Code Section 20104 Application of article; provisions included in plans and specifications

(a) (1) This article applies to all public works claims of three hundred seventy-five thousand dollars ($375,000) or less which arise between a contractor and a local agency.

(2) This article shall not apply to any claims resulting from a contract between a contractor and a public agency when the public agency has elected to resolve any disputes pursuant to Article 7.1 (commencing with Section 10240) of Chapter 1 of Part 2.

(b) (1) “Public work” means “public works contract” as defined in Section 1101 but does not include any work or improvement contracted for by the state or the Regents of the University of California.

(2) "Claim" means a separate demand by the contractor for (A) a time extension, (B) payment of money or damages arising from work done by, or on behalf of, the contractor pursuant to the contract for a public work and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to, or (C) an amount the payment of which is disputed by the local agency.
(c) The provisions of this article or a summary thereof shall be set forth in the plans or specifications for any work which may give rise to a claim under this article.
(d) This article applies only to contracts entered into on or after January 1, 1991.

Public Contract Code Section 20104.2 Claims; requirements, tort claims excluded
For any claim subject to this article, the following requirements apply:
(a) The claim shall be in writing and include the documents necessary to substantiate the claim.
Claims must be filed on or before the date of final payment. Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims.
(b) (1) For claims of less than fifty thousand dollars ($50,000), the local agency shall respond in writing to any written claim within 45 days of receipt of the claim or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant.
(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.
(3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 15 days after receipt of the further documentation, or within a period of time no greater than that taken by the claimant in producing the additional information whichever is greater.
(c) (1) For claims of over fifty thousand dollars ($50,000) and less than or equal to three hundred seventy-five thousand dollars ($375,000), the local agency shall respond in writing to all written claim within 60 days of receipt of the claim, or may request in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses to the claim the local agency may have against the claimant.
(2) If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the local agency and the claimant.
(3) The local agency's written response to the claim, as further documented, shall be submitted to the claimant within 30 days after receipt of the further documentation. or within a period of time no greater than that taken by the claimant in producing the additional information or requested documentation, whichever is greater.
(d) If the claimant disputes the local agency's written response, or the local agency fails to respond within the time prescribed, the claimant may so notify the local agency, in writing, either within 15 days of receipt of the local agency’s response or within 15 days of the local agency’s failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the local agency shall schedule a meet and confer conference within 30 days for settlement of the dispute.
(e) Following the meet and confer conference, if the claim or any portion remains in dispute, the claimant may file a claim as provided in Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. For purposes of those provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his or her written claim pursuant to subdivision (a) until the time that claim is denied as a result of the meet and confer process, including any period of time utilized by the meet and confer process.
(f) This article does not apply to tort claims and nothing in this article is intended nor shall be construed to change the time periods for filing tort claims or actions specified by Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code.

Public Contract Code Section 20104.4 Civil action procedures; mediation and arbitration: trial de novo: witness
The following procedures are established for all civil actions filed to resolve claims subject to this article:

(a) Within 60 days, but no earlier than 30 days, following the filing or responsive pleadings, the court shall submit the matter to non-binding mediation unless waived by mutual stipulation of both parties. The process shall provide for the selection within 15 days by both parties of a disinterested third person as mediator, shall be commenced 30 days of the submittal, and shall be concluded within 15 days from the commencement of the mediation unless a time requirement is extended upon a good cause showing to the court or by stipulation of parties. If the parties fail to select a mediator within the 15-day period, any party may petition the court to appoint the mediator.

(b) (1) If the matter remains in dispute, the case shall be submitted to judicial arbitration pursuant to Chapter 2.5 (commencing with Section 1141.10) of Title 3 of Part 3 of the Code of Civil Procedure, notwithstanding Section 1141.11 of that code. The Civil Discovery Act of (Article 3 (commencing with Section 2016) of Chapter 3 of Title 3 Part 4 of the Code of Civil Procedure) shall apply to any proceeding brought under this subdivision consistent with the rules pertaining to judicial arbitration.

(2) Notwithstanding any other provision of law, upon stipulation of parties, arbitrators appointed for purposes of this article shall be experienced in construction law, and, upon stipulation of the parties, mediators and arbitrators shall be paid necessary and reasonable hourly rates of pay not to exceed their customary rate, and such fees and expenses shall be paid equally by the parties, except in the case of arbitration where the arbitrator, for good cause, determines a different division. In no event shall these fees or expenses be paid by state or county funds.

(3) In addition to Chapter 2.5 (commencing with Section 1141.10) Title 3 of Part 3 of the Code of Civil Procedure, any party who receiving an arbitration award requests a trial de novo but does obtain a more favorable judgment shall, in addition to payment of costs and fees under that chapter, pay the attorney's fees of the other arising out of the trial de novo.

(c) The court may, upon request by any party, order any witnesses participate in the mediation or arbitration process.

Public Contract Code Section 20104.6 Payment of portion of claim which is undisputed; of interest on arbitration award or judgment
(a) No local agency shall fail to pay money as to any portion of a claim which is undisputed except as otherwise provided in the contract.

(b) In any suit filed under Section 20104.4, the local agency shall pay interest at the legal rate on any arbitration award or judgment. The interest shall begin to accrue on the date the suit is filed in a court of law.

(d) Final Payment. Payment will be made in accordance with the provisions of Section 9-1.17 of the Standard Specifications provided however that in no event will the final payment be made within 35 calendar days after the filing of Notice of Completion.
The final estimate shall be conclusive and binding against both parties to the contract on all questions relating to the performance of the contract and the amount of work done thereunder and compensation therefore.

19. MISCELLANEOUS PROVISIONS

(a) **Licenses and Permits.** Any and all licenses and permits required shall be provided by the Contractor and he shall abide by any and all Federal, State and County laws and rules affecting the work and shall maintain all required protection for property, employees and the public and insurance in connection with same, for all of which he shall bear necessary expense.

(b) **Building Laws, etc.** The Contractor shall conform to and abide by all County and State Building, Labor, Sanitary and Electrical Codes, Ordinances, Laws, Rules and Regulations. Such laws and regulations shall be considered a part of these Special Provisions as if set forth herein in full and the work and materials shall be in accordance therewith.

(c) **Guarantees.** All work performed and equipment or material furnished shall be guaranteed for one (1) year from date of acceptance against any inherent or developed defects of materials or workmanship in manufacture or installations.

All guarantees normally provided by manufacturers of equipment or material installed under this project shall be furnished to COUNTY and shall remain in force for their normal life.

(d) **Ownership of Plans and Specifications.** All drawings, specifications and copies thereof provided to the Bidder by COUNTY shall remain the property of COUNTY and they shall not be used by the Contractor or its subcontractors on other work.

(e) **Addenda.** Any addenda or notices issued during the time of bidding and forming a part of the documents provided to the Bidder for the preparation of his bid, shall be covered in the bid and shall be made a part of the contract. The Bidder shall acknowledge receipt of addenda in the space provided in the Proposal.

Should a bidder find apparent discrepancies in the drawings or documents, or should he be in doubts to their meaning, he should at once notify the Napa County Public Works Department, which will send a written instruction to all bidders. COUNTY will not be responsible for oral instructions.

20. OWNER’S RIGHT TO DO WORK

COUNTY as Owner reserves the right to let other contracts in connection with this work. The Contractor shall afford other contractors on the job site reasonable opportunity for introduction and storage of their materials and execution of their work and shall properly connect and coordinate his work with theirs.
If any part of the Contractor's work depends for proper execution or results upon work of any other Contractor, the Contractor shall inspect and promptly report to the Engineer any defects in such work that render it unsuitable for proper execution and results. His failure to so inspect and report shall constitute his acceptance of other Contractors' work as fit and proper for reception of his work, except as to defects which may develop in other Contractors' work after execution of his work.

To insure proper execution of his subsequent work, the Contractor shall measure and inspect work already in place and shall at once report to the Engineer any discrepancy between executed work and contract documents.

The Contractor shall ascertain to his own satisfaction the scope of the project and nature of any other contracts that have been or may be awarded by owner in prosecution of the project to the end that the Contractor may perform this contract in the light of such other contracts, if any. Nothing herein contained shall be interpreted as granting to the Contractor exclusive occupancy at the site of project. The Contractor shall not cause any unnecessary hindrance or delay to any other Contractors working on project. If simultaneous execution of any contract for the project is likely to cause interference with performance of some other contract or contracts, the owner shall decide which Contractor shall cease work temporarily and which Contractor then shall continue or whether work can be coordinated so that the Contractors may proceed simultaneously.

21. **EQUAL OPPORTUNITY EMPLOYMENT**

During the performance of the Contract, the Contractor shall comply with all applicable laws, ordinances, regulations, and codes, including but not limited to, the following:

(a) **Non-Discrimination.** During the performance of the work required by the Contract, the Contractor and its subcontractors shall not deny the benefits thereof to any person on the basis of sex, race, color, ancestry, religion or religious creed, national origin or ethnic group identification, sexual orientation, marital status, age (over 40), mental disability, physical disability or medical condition (including cancer, HIV and AIDS), nor shall they discriminate unlawfully against any employee or applicant for employment because of sex, race, color, ancestry, religion or religious creed, national origin or ethnic group identification, sexual orientation, marital status, age (over 40), mental disability, physical disability or medical condition (including cancer, HIV and AIDS), or use of family care leave. The Contractor shall ensure that the evaluation and treatment of employees and applicants for employment are free of such discrimination or harassment. In addition to the foregoing general obligations, the Contractor shall comply with the provisions of the Fair Employment and Housing Act (Government Code section 12900, et seq.), the regulations promulgated thereunder (Title 2, California Code of Regulations, section 7285.0, et seq.), the provisions of Article 9.5, Chapter 1, Part 1, Division 3, Title 2 of the Government Code (sections 11135-11139.5) and any state or local regulations adopted to implement any of the foregoing, as such statutes and regulations may be amended from time to time. To the extent this Contract subcontracts to the Contractor work required of the County by the State of California pursuant to
agreement between the County and the State, the applicable regulations of the Fair Employment and Housing Commission implementing Government Code section 12990 (a) through (f), set forth in Chapter 5 of Division 4 of Title 2 of the California Code of regulations are expressly incorporated into this Agreement by reference and made a part hereof as if set forth in full, and the Contractor and any of its subcontractors shall give written notice of their obligations thereunder to labor organizations with which they have collective bargaining or other agreements.

(b) Documentation of Right to Work. The Contractor shall abide by the requirements of the Immigration and Control Reform Act pertaining to assuring that all newly-hired employees of the Contractor performing any of the work under the Contract have a legal right to work in the United States of America, that all required documentation of such right to work is inspected, and that INS Form 1-9 (as it may be amended from time to time) is completed and on file for each employee. The Contractor shall make the required documentation available upon request to the County for inspection.

(c) Inclusion in Subcontracts. To the extent any of the work to be performed by Contractor under the Contract is subcontracted to a third party, the Contractor shall include the provisions of (a) and (b), above, in all such subcontracts as obligations of the subcontractor.

22. COUNTY POLICIES ON WASTE, HARASSMENT, DRUG/ALCOHOL-FREE, VIOLENCE-FREE WORKPLACE.

Contractor hereby agrees to comply, and require its employees and subcontractors to comply, with the following policies, copies of which are on file with the Clerk of the Board of Supervisors and incorporated by reference herein. Contractor also agrees that it shall not engage in any activities, or permit its officers, agents and employees to do so, during the performance of any of the services required under this Agreement, which would interfere with compliance or induce violation of these policies by COUNTY employees or contractors.

   (b) County of Napa “Policy for Maintaining a Harassment Free Work Environment” revised effective June 20, 2017.
   (c) County of Napa Drug and Alcohol Policy adopted by resolution of the Board of Supervisors on May 1, 2009.
   (d) Napa County Workplace Violence Policy, adopted by the BOS effective May 23, 1995 and subsequently revised effective November 2, 2004, which is located in the County of Napa Policy Manual Part I, Section 37U.

23. REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR.

Before starting each portion of the work, the Contractor shall carefully study and compare the Contract Documents relative to that portion of the work, shall take field measurements
of any existing conditions related to that portion of the work and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating construction by the contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, any errors, inconsistencies, or omissions discovered by the contractor shall be reported promptly to the Engineer as a request for information in such form as the Engineer may require.

Any design errors or omissions noted by the Contractor during this review shall be reported promptly to the Engineer, but it is recognized that the Contractor’s review is made in the Contractor’s capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents. The Contractor is not required to ascertain that the contract Documents are in accordance with applicable laws, statutes, ordinances, building codes, and rules and regulations, but any nonconformity discovered by or made known to the contractor shall be reported promptly to the Engineer.

24. **SUPERVISION AND CONSTRUCTION PROCEDURES**

(a) **Supervision And Direction Of Work.** The Contractor shall supervise and direct the work, using the contractor’s best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the work under the contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Engineer and shall not proceed with that portion of the work without further written instructions from the Engineer. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any resulting loss or damage.

(b) **Responsibility Of Work.** The Contractor shall be responsible to the Owner for acts and omissions of the Contractor’s employees, subcontractors, and their agents and employees, and other persons or entities performing portions of the work for or on behalf of the Contractor or any of its subcontractors.

(c) **Subsequent Work.** The Contractor shall be responsible for inspection of portions of work already performed to determine that such portions are in proper condition to receive subsequent work.

(d) **Superintendent.** The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor. Important communications
shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

25. **INTERPRETATION; VENUE.**

   (a) **Interpretation.** The headings used herein are for reference only. The terms of the Agreement are set out in the text under the headings. This Agreement shall be governed by the laws of the State of California without regard to the choice of law or conflicts.

   (b) **Venue.** This Agreement is made in Napa County, California. The venue for any legal action in state court filed by either party to this Agreement for the purpose of interpreting or enforcing any provision of this Agreement shall be in the Superior Court of California, County of Napa, a unified court. The venue for any legal action in federal court filed by either party to this Agreement for the purpose of interpreting or enforcing any provision of this Agreement lying within the jurisdiction of the federal courts shall be the Northern District of California. The appropriate venue for arbitration, mediation or similar legal proceedings under this Agreement shall be Napa County, California; however, nothing in this sentence shall obligate either party to submit to mediation or arbitration any dispute arising under this Agreement.

26. **SECTIONS OF THE 2018 STANDARD SPECIFICATIONS EXPRESSLY INAPPLICABLE.**

   Section 5-1.09 “Partnering” and all of its subparts and Section 5-1.43E “Alternative Dispute Resolution” and all its subparts are hereby removed in their entirety and shall have no application apply to this Agreement.

27. **FORCE MAJEURE**

   In the event the work is delayed due to causes which are outside the control of both parties and their subcontractors, consultants and employees, and could not be avoided by the exercise of due care, which may include, but is not limited to, delays by regulating agencies, wars, floods, adverse weather conditions, labor disputes, unusual delay in transportation, epidemics abroad, earthquakes, fires, terrorism, the COVID-19 pandemic or other incidence of disease or illness that reaches outbreak, epidemic and/or pandemic proportions or otherwise affects the area in which the Project is located and the Contractor’s labor or supply chain, unusual delay in deliveries, riots, civil commotion or other unavoidable casualties, and other acts of God, both parties will be entitled to an extension in their time for performance equivalent to the length of delay. Neither party will be entitled to compensation from the other for force majeure events.

28. **COVID-19**

   Some or all of the work will be performed during a state of emergency due to the COVID-19 pandemic. Minimizing the risk of transmission among workers is essential. Contractor shall take reasonable efforts to follow these guidelines to increase hygiene on the jobsite:

   (a) Add sanitary facilities (toilet and hand washing stations with soap and hand sanitizer provided). Workers should both wash their hands with soap for twenty seconds and use hand sanitizer often.
(b) Perform deep cleaning on jobsites including disinfecting handrails, doorknobs, equipment handles and tools on an accelerated basis.
(c) Instead of having group safety meetings, and to keep the suggested social distance, hold smaller individual safety meetings at the jobsite maintaining social distancing guidelines.
(d) Keep separation of at least 6 feet as feasible while on the job and always during rest and break periods and lunches; there should not be any group gatherings.
(e) Ask workers to consider bringing a lunch made at home and stay away from congested lunch trucks and coffee shops. Ask workers to try and go directly from work to home and vice versa with as little contact with the general public as possible.
(f) Ensure workers wear and utilize all safety equipment available on the jobsite. Contractors should provide all protective equipment as available.
(g) Instruct sick workers to stay at home.
(h) Remind workers not to shake hands when greeting others.
(i) Remind workers not to touch their eyes, notes, or mouth with unwashed hands.
SPECIAL PROVISIONS - SECTION ‘B’
GENERAL REQUIREMENTS

1. GENERAL

The Contractor shall take all reasonable precautions to restrict operations to the least area of work possible and to minimize interference with traffic along the County roads, and shall not disturb private property beyond the areas of work.

The Contractor shall provide access to private properties at all times.

The Contractor shall maintain continuous access to the United States Postal Service and emergency services. The Contractor shall notify the local postmaster and emergency services at least 48 hours before work will commence.

Personal vehicles of the Contractor’s employees shall not be parked on the traveled way or shoulders, including any section closed to public traffic. Temporary “NO-STOPPING,” “NO PARKING,” and “TOW-AWAY” signs shall be posted by the Contractor upon authorization of the County.

Weekend Work: Contractor shall provide an advance written notice to the County, Construction Manager at least five days prior to working on the weekend. Contractor shall also provide the specific scope of work that will be occurring on the weekend.

The Contractor shall provide to the Engineer the names, address and telephone numbers of at least two emergency contacts for the duration of the contract.

2. GENERAL REQUIREMENTS

(a) LAYOUT OF WORK – The Contractor shall lay out the work as directed by the Engineer in the field.

(b) TRAFFIC CONTROL PLAN – The Contractor shall prepare the Temporary Traffic Control Plan (TCP) for Engineers review and approval. The TCP shall be submitted to the Engineers at the preconstruction meeting and at the minimum shall include number and location of all Construction Area Signs, Temporary Traffic Control Signs including Portable Changeable Message Signs, number of flaggers, pilot cars, etc.

(c) MATERIAL SAFETY DATA SHEETS (MSDS) – The Contractor shall provide MSDS for each product used on site.

(d) PROTECTION OF EXISTING FACILITIES AND PROPERTY – Protection of existing facilities shall conform to Section 5-1.36, “Property and Facility Preservation,” of the Standard Specifications and these Special Provisions.

The Contractor shall notify Underground Service Alert (USA) for marking the locations of existing underground facilities at least 2 working days, but not more than 14 calendar days,
prior to performing any excavation or other work close to any underground pipeline, conduit, duct, wire or other structure.

Regional notification centers include but are not limited to the following:

<table>
<thead>
<tr>
<th>Notification Center</th>
<th>Telephone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underground Service Alert</td>
<td>1-800-642-2444</td>
</tr>
<tr>
<td>Northern California (USA)</td>
<td>1-800-227-2600</td>
</tr>
<tr>
<td>Underground Service Alert</td>
<td>1-800-422-4133</td>
</tr>
<tr>
<td>Southern California (USA)</td>
<td>1-800-227-2600</td>
</tr>
</tbody>
</table>

The Contractor shall immediately notify the County Engineer of any facilities found that may interfere with work to be performed. The Contractor shall take all necessary measures to avoid injury to existing surface and underground utility facilities in and near the site of the work. If damage should occur to the existing facilities, the utility company and the County shall be notified immediately and repairs acceptable to the utility company shall be made at the Contractor’s expense.

Existing trees, shrubs, and other plants, that are injured or damaged by reason of the Contractor’s operations, shall be replaced by the Contractor.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various contract items of work and no additional compensation will be allowed.

(e) DAMAGES – The Contractor shall be responsible for any damages to existing facilities, utilities and roads due to causes attributable to the work, and all such damaged facilities, utilities and roads shall be repaired when directed by the Engineer and as required to place them in as good as condition as existed before commencement of the work.

(f) EMERGENCY SERVICE PROVIDERS NOTIFICATIONS – The Contractor shall furnish the name and phone number of a representative that can be contacted in the event of an emergency. Said information shall be reported to the County Sheriff dispatcher, and updated as required to provide 24-hour phone access.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various contract items of work and no additional compensation will be allowed.

(g) PUBLIC SAFETY – The Contractor shall at all times conduct his work in accordance with Construction Safety Orders of the Division of Industrial Safety, State of California, to insure the least possible obstruction to traffic and inconvenience to the general public, and adequate protection of persons and property in the vicinity of the work.

No access way shall be closed to the public without first obtaining permission from the Engineer.
The Contractor shall furnish, erect and maintain all lights, signs, barricades and barriers necessary to give adequate warning to the public at all times and shall provide such guards as may be necessary to prevent accidents and avoid damage and injury.

Should the Contractor fail to provide public safety as specified or if, in the opinion of the Engineer, the warning devices furnished by the Contractor are not adequate, the County may place any warning lights or barricades or take any necessary action to protect or warn the public of any dangerous condition connected with the Contractor’s operations and the Contractor shall be liable to the County for all costs incurred plus 100%.

Nothing in this section shall be construed to impose tort liability on the County or Engineer. Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various contract items of work and no additional compensation will be allowed.

(h) WATER FOR CONSTRUCTION – Construction water shall conform to Section 10-6, “Watering,” of the Standard Specifications and these Special Provisions.

Water for construction activities shall be provided by the contractor. The Contractor shall contain all water within the limits of the project and prevent discharge to adjacent wetland, ditches, creeks and other facilities.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various contract items of work and no additional compensation will be allowed.

(i) EXISTING UTILITIES – The Contractor shall notify all utility companies and request field location markings of existing facilities prior to commencing construction. Where potential conflict with existing underground utilities may constitute a safety hazard or interfere with the progress of work, such facilities shall be hand-excavated to determine their precise location. Contractor shall be liable for damages to all utilities whether so located and marked or not.

It is not the intent of the Plans to show the exact location or extent of existing underground utilities or structures, and the Engineer assumes no responsibility therefor. It is the Contractor’s responsibility to verify all existing utility locations and notify the Engineer in case of conflict.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various contract items of work and no additional compensation will be allowed.

(j) COOPERATION – The Contractor shall cooperate with the occupants of the existing facilities adjacent to the project and coordinate the work in such a manner as to minimize the disruption to the existing facilities.
Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various contract items of work and no additional compensation will be allowed.

(k) SAFETY – The Contractor shall comply with all the applicable provisions of the United States Department of Labor Occupational Safety and Health Act (OSHA), State of California Division of Industrial Safety, Title 8, Safety Orders (Cal-OSHA) and any other applicable codes and regulations.

If, in the opinion of the Engineer, any operation or piece of equipment that is observed by the Engineer appears to be unsafe, the Engineer may immediately halt that portion of the work until the hazard is corrected to the satisfaction of the Engineer and no time extension or additional compensation shall be granted for the time lost due to said halting of the work.

(l) DISPOSITION OF REMOVED MATERIALS – Attention is directed to section, the Contractor shall be responsible for the disposal of all surplus excavation materials off the site. The Contractor shall not dispose of any materials from demolition or removal by sale, gift or in any manner whatsoever, to the general public at the site. Disposal operations shall comply with all applicable laws and ordinances and must be approved by the Engineer.

(m) CONSTRUCTION LIMITATIONS – The Contractor will be expected to conduct his operations in a manner which creates minimum damage to the natural vegetation and landscaping, paving and gravel areas. Care shall be exercised to avoid hazards that may cause injury to persons, animals or property either during working hours or after work hours, which will include dust control, backfilling trenches or placement of steel plates and temporary fencing as required. Equipment will be restricted to the immediate area of construction and trenches will be backfilled as soon as possible.

Receptacles for construction residue, including oil, cleaning fluids and litter, will be covered. Such residues will be disposed of in a proper manner.

Mufflers and/or baffles will be required on all construction equipment.

Construction activity within the existing right-of-way will be scheduled to minimize traffic inconvenience and safety hazards to motorists, pedestrians and cyclists

(n) CLEAN UP – Clean up shall be performed to prevent accidents to personnel, protect all work in place, and to effect completion of the project in an orderly manner. Excess debris shall be removed from the work area immediately so as not to clutter the existing facilities. Access to all other properties within the project area shall be unobstructed and passable between the hours of 7:00 p.m. and 7:00 a.m. weekdays, on weekends and holidays, and whenever work is not actively in progress.

(o) EQUIPMENT – Standard construction equipment shall be used and shall be maintained in a safe and satisfactory condition at all times and in compliance with the latest provisions of the CAL/OSHA regulations. All trucks and other heavy equipment shall be well maintained and in proper working order and in compliance with all applicable laws and regulations.
(p) WORKING HOURS REQUIREMENTS – Normal work week shall be Monday through Friday 7:00 a.m. to 7:00 p.m. unless otherwise approved by the Engineer.

(q) SCOPE – Contractor shall take into account all costs associated with the improvements as discussed in the technical specifications, when preparing the bid and shall take into account the working hour restrictions.

3. ORDER OF WORK

Order of work shall conform to these Special Provisions.

The Contractor shall prepare and submit a work plan and schedule in accordance with Section 8, “Prosecution and Progress,” of the Standard Specifications and in a form provided by, or acceptable to, the Engineer and submit information describing the Contractor's proposed procedures and methods of operation.

No work may begin under the contract until the schedule and description of proposed procedures and methods of operation material have been approved by the Engineer. Time required for review and approval of these items shall not constitute a basis for time extension.

The Contractor shall verify the location of all existing utilities.

No work may begin under the contract until traffic control and construction signage is implemented.

The Contractor shall order work to minimize obstruction to adjacent property owners and inconvenience to the traveling public. The contractor will coordinate with the County and establish traffic control and implement work in a manner which provides the greatest possible access to the property owners adjacent to the work area.

Full compensation for complying with the above provisions shall be considered as included in the contract price for the various bid items, and no separate payment will be made.

4. MOBILIZATION

Mobilization shall conform to Section 9 of the Technical Specification.

5. SUBMITTALS

Attention is directed to Section 5-1.23 “Submittals,” of the Standard Specifications and these Special Provisions. The contractor shall submit products or materials list, specifications and schedule at the pre-construction meeting. The contractor shall submit for the Engineer’s approval, six cut sheets for all of the products and materials to be used for all work on the project. The cut sheets submitted by the contractor shall clearly describe how the proposed products or materials meet the specifications of the products and materials requested in the project specifications.
Submit at Contractor’s expense, in six (6) sets, Schedule of Shop Drawing and Sample Submittals, Safety Plans, Progress Schedule, Product Data, Shop Drawings, Samples, Substitution Requests, Quality Control Plan, Operations and Maintenance Manuals, Warranties, and Project Record Documents, and all other submittals required by the Contract Documents.

Submit these submittals to Engineer, for review and approval in accordance with accepted schedule of Shop Drawings and Samples submittals. All Shop Drawing, Samples and product data submittals shall be submitted to and approved by the Engineer prior to ordering of material or commencement of work. The Engineer shall be given adequate time for review of submittals.

6. SUBSTITUTION OF MATERIALS AND PRODUCTS

All substitution requests and submittals must be made in writing, and be submitted to and approved by the Engineer prior to ordering of material or commencement of work. Submittals shall be made in accordance with the above section.

7. CONSTRUCTION AREA SIGNS

Construction area signs will be provided by the Contractor. Contractor shall coordinate with the Engineer on construction area signs and submit for Engineer’s review and approval at the pre-construction meeting. Full Compensation for Construction Area Signs will be included in the Contract Lump Sum paid for Mobilization and no additional compensation will be allowed therefore.

8. MAINTAINING TRAFFIC

Maintaining traffic shall conform to the provisions of Section 7-1.03 “Public Convenience”, Section 7-1.04 “Public Safety” and Section 12 “Temporary Traffic Control” of the Standard Specifications and these Special Provisions. The Contractor shall prepare a Temporary Traffic Control Plan in compliance with Standard Specifications and these Special Provisions and submit for Engineer’s review and approval at the pre-construction meeting.

The Contractor shall install all construction area signs and traffic controls prior to start of work. Construction area signs shall be furnished, installed, maintained and removed when no longer required by the County.

One lane shall be kept open to public traffic at all times. Full lane closure is not allowed. Lane closure will require 72 hours’ notice to the Engineer and 48 hours’ notice to the property owners.

The Contractor shall coordinate and give adequate warning to the public at all times and shall provide such guards necessary to prevent accidents and avoid damage and injury.

If any component in the traffic control system is displaced, or ceases to operate or function as specified, from any cause, during the progress of work, the Contractor shall immediately notify the Engineer and remedy the situation. Full Compensation for Maintaining Traffic will be included in the Contract Lump Sum paid for Mobilization and no additional compensation will be allowed therefore.
9. **STORM WATER POLLUTION PREVENTION MEASURES**

Contractor shall comply with all Storm Water Pollution Prevention requirements as required by the Regional Water Quality Control Board and Napa County. The Contractor shall implement water quality control measures to effectively handle storm water run-off both during and after construction. The contractor shall utilize best management practices as directed by the Engineer and as specified in these Special Provisions.

Full compensation for complying with the above provisions shall be considered as included in the contract price for the various bid items, and no separate payment will be made.

10. **PRESERVATION OF PROPERTY**

Preservation of property shall conform to the provisions of Section 5-1.36, “Property and Facility Preservation,” of the Standard Specifications and of these Special Provisions. Attention is directed to Section 9-1.16, “Mobilization”.

The Contractor shall examine the site and have full knowledge of the conditions and difficulties to be met. No variations or allowance from the contract sum will be made because of lack of knowledge.

The Contractor shall provide the necessary safeguards, shall exercise caution against injury or defacement of existing improvements and plantings and shall be responsible for the damage resulting from operations. Repair or replacement of such damage shall be at no cost to the County.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various contract items of work and no additional compensation will be allowed.

11. **DUST CONTROL**

Dust control shall conform to the provisions in Section 14-11.04, "Dust Control," of the Standard Specifications and these Special Provisions.

During the performance of the work called for under these Specifications, or any operations appurtenant thereto, the Contractor shall furnish all labor, equipment and means required, and as often as necessary, to prevent his operations from producing dust in amounts damaging to property or causing a nuisance to persons living nearby or occupying buildings in the vicinity.

Full compensation for conforming to the requirements of this section shall be considered as included in the contract prices paid for the various contract items of work and no separate payment will be made for work performed or material used to control dust resulting from the Contractor’s performance of the work, either inside or outside the right of way.
PROJECT MANUAL
INCLUDING SPECIFICATIONS
FOR
CONSTRUCTION
OF THE

CARNEROS VOLUNTEER
FIRE STATION 210

5260 Old Sonoma Road
Napa, CA 94559

ISSUE FOR PERMIT

County of Napa
DEPARTMENT OF PUBLIC WORKS

Project PW 20-27

ARCHITECTS

SHAH KAWASAKI ARCHITECTS
570 10th Street, Suite 201
Oakland, CA 94607

T: 510.663.6090

MAY 11, 2021
SECTION 00 01 10

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DIVISION 8 – OPENINGS

Section 08 11 10 Hollow Metal Doors and Frames
08 36 10 Aluminum Sectional Overhead Doors (Alternate)
08 41 00 Storefronts (Alternate)
08 71 00 Door Hardware

DIVISION 9 – FINISHES

Section 09 21 00 Gypsum Board Assemblies
09 30 00 Tiling
09 90 00 Painting and Coating
09 96 70 High Performance Coating

DIVISION 10 – SPECIALTIES

Section 10 14 00 Signage
10 28 00 Toilet Accessories
10 75 00 Metal Flagpoles (Alternate)

DIVISION 11 – EQUIPMENT

Not in Contract.

DIVISION 12 – FURNISHINGS

Not used.

DIVISION 13 – SPECIAL CONSTRUCTION

Section 13 34 00 Pre-Engineered Building
DIVISION 21 – FIRE SUPPRESSION
Section 21 00 00 Fire Sprinklers (Alternate)

DIVISION 22 – PLUMBING
Section 22 00 00 Plumbing

DIVISION 23 – HEATING VENTILATING AND AIR CONDITIONING
Section 23 00 00 Heating, Ventilating, and Air Conditioning Systems

DIVISION 26 – ELECTRICAL
Section 26 05 00 Common Work Results for Electrical
26 05 19 Low Voltage Electrical Power Conductors and Cables
26 05 26 Grounding and Bonding for Electrical Systems
26 05 29 Hangers and Supports for Electrical Systems
26 05 33 Raceways and Boxes for Electrical Systems
26 05 46.13 Electrical Utility Systems
26 05 46.16 Telephone Utility Service
26 05 53 Identification of Electrical Systems
26 24 16 Panelboards
26 27 26 Wiring Devices
26 32 13 Generator System (Alternate)
26 36 23 Automatic Transfer Switches
26 51 00 Lighting Systems
26 56 70 Lighting Acceptance Testing

DIVISION 27 – COMMUNICATIONS
Provided by Owner

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY
Section 28 31 00 Fire Sprinkler Monitoring and System (Alternate)

DIVISION 31 – EARTHWORK
See Civil Drawings

DIVISION 32 – EXTERIOR IMPROVEMENTS
Section 32 17 00 Parking Bumpers
32 84 00 Irrigation System
32 90 00 Landscape Planting

DIVISION 33 – UTILITIES
See Civil Drawings

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Project consists of construction of the Carneros Volunteer Fire Station No 210, PW 20-27, 5260 Old Sonoma Road, Napa, California 94559, as indicated in Contract Documents.

   1. Items noted "NIC" (Not In Contract) will be furnished and installed by Owner or under separate contract.

B. Division 01: Where provisions of Special Provisions relate to Project administration or work-related requirements of the Contract, those paragraphs are expanded in Division 01 - General Requirements.

   1. Special Provisions and Division 01 - General Requirements contain information necessary for completion of every part of Project.

   2. Where items of Work are done under subcontracts, each item shall be subject to these conditions.

C. Special Coordination for Pre-Engineered Building: Majority of Project consists of pre-engineered building construction with modifications and additions as indicated in Contract Documents.

   1. Coordinate with Section 13 34 00 – Pre-Engineered Building.

1.2 REQUIREMENTS INCLUDED

A. This section includes administrative provisions:

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

1.3 WORK SEQUENCE

A. Coordinate construction schedule and operations with Owner and Architect.
1.4 CONTRACTOR USE OF PREMISES
   A. Limit use of premises for Work and construction operations and to allow for work by other contractors.
   B. Coordinate use of premises and access to site under direction of Owner and Architect.

1.5 FIELD ENGINEERING
   A. Provide field engineering services; establish lines and levels by use of recognized engineering survey practices.
   B. Locate and protect control and reference points.

1.6 REGULATORY REQUIREMENTS AND REFERENCE STANDARDS
   A. Regulatory Requirements:
      1. Architect has contacted governing authorities and reviewed design requirements of local, state, and federal agencies for applicability to Project.
      2. Contractor shall be responsible for contacting governing authorities directly for necessary information and decisions bearing upon performance of Work.
   B. Reference Standards:
      1. For Products specified by association or trade standards, comply with requirements of referenced standard, except when more rigid requirements are specified or are required by applicable codes.
      2. Applicable date of each standard is that in effect as of date on proposal or date on Contract where no proposal is available, except when a specific date is specified.

1.7 OWNER FURNISHED CONTRACTOR INSTALLED (OFICI) PRODUCTS
   A. Select products are to be furnished and paid for by Owner and installed by Contractor:
      1. Refer to Drawings and Specifications.
   B. Owner's Responsibilities:
      1. Arrange for and deliver shop drawings, product data, and samples to Contractor.
      2. Arrange and pay for product delivery to site.
      3. Inspect products jointly with Contractor on delivery.
      4. Submit claims for transportation damage.
      5. Arrange for replacement of damaged, defective, or missing items.
      6. Arrange for manufacturer's warranties, inspections, and service.
C. Contractor's Responsibilities:

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

1.8 SPECIAL DEFINITIONS

A. Approved: Approved, directed, selected, required, ordered, designated, accepted, acceptable, and satisfactory shall require written action by Architect.

B. Equal, or Approved Equal: Equal and approved equal shall require requests for substitutions for products or manufacturers not specified.

1. Requests for substitutions shall be in accordance with requirements of Section 01 25 00 - Substitution Procedures.

C. Furnish: Furnish means supply and deliver to Project, unless otherwise defined in greater detail.

D. Install: Install is used to describe operations at Project, from inspecting and unloading, to completion in place, ready for intended use.

E. Provide: Provide means furnish and install, complete and ready for intended use, unless otherwise defined in greater detail.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Comply with Title 24, California Building Code, Chapter 7A Materials and Construction Methods for Exterior Wildfire Exposure.

1. Project is within area designated as Wildland-Urban Interface Fire Area.

1.2 SPECIAL REQUIREMENTS

A. Comply with standards for protection of life and property by increasing ability of building to resist intrusion of flames and burning embers projected by vegetation fire.

B. Inspections and Certifications: Comply with requirements for certifications by applicable authority that building complies with all applicable state and local building standards including those related to wildfire exposure.

C. Vegetation Management: Comply with California Fire Code Section 4906, including California Public Resources Code 4291 or California Government Code Section 51182 relating to vegetation management requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Weathering: Fire-retardant treated exterior wood products shall meet fire test performance requirements specified after being subjected to weathering conditions as applicable to materials and conditions of use.


2. Surface treatments such as paints, coatings, and stains are not acceptable.


C. Roofing: Roofing materials shall be classified as Class A; sheathing shall be fire resistant.

1. Where roof profile allows space between roof covering and roof decking provide firestopping to prevent intrusion of flames and embers such as 72-pound mineral-surfaced nonperforated cap sheet, ASTM D3909, over combustible decking.

2. Where valley flashing is installed, install over not less than one layer minimum 72-pound mineral surfaced nonperforated cap sheet, ASTM D3909, 36” wide, full length of valley.

3. Roof Gutters: Provide with means to prevent accumulation of leaves and debris in gutters.
D. Vents: Ventilation openings as defined by Chapter 7A shall resist building ignition from intrusion of burning embers and flame through ventilation openings.

   1. Cover with metal wire mesh or other noncombustible materials acceptable under Chapter 7A.

E. Exterior Coverings: Exterior wall covering materials, wall assemblies, underside of roof eave overhangs and roof eave soffits, exterior underside of floor projections, and exterior under floor areas shall be noncombustible or ignition resistant materials.


F. Exterior Windows and Doors (Including Door Glazing): Comply with one of following requirements in accordance with Chapter 7A.

   1. Provide multipane glazing with at least one pane fully tempered safety glazing as defined in Section 2406.

   2. Have fire-resistant rating of not less than 20 minutes, NFPA 257.


G. Exterior Doors: Comply with one of following requirements in accordance with Chapter 7A.

   1. Exterior surface or cladding of door shall be noncombustible or ignition resistant material.

   2. Provide fire resistance rating of not less than 20 minutes, NFPA 252.


PART 3 - EXECUTION

3.1 INSTALLATION

   A. General: Comply with applicable standards and manufacturer recommendations for installation of noncombustible and ignition-resistant materials.
PART 1 - GENERAL

1.1 GENERAL

A. Unless otherwise specified in other individual sections of these specifications, quantities of work shall be determined from measurements or dimensions in horizontal planes.

B. Units of measurement shall be in accordance with U.S. Standard Measures.

C. See Sections 17 of the Special Provisions related to progress payments and payment schedule to the contractor.

1.2 PAYMENT PROVISIONS

The contractor shall provide unit price information on the Unit Price Bid Summary Sheet.

PART 2 - MATERIALS

2.1 The measurement and payment items are listed below:

The payments to the Contractor are based on the following items. It is the intent that the scope of the description of the following items encompasses the entire scope of the Work as shown on the plans and described in the specifications. The bid amounts shall be for complete in place installations.

The Contractor is reminded that written permission to dispose of any material must be obtained and delivered to the Engineer in advance of any disposal activities. Failure to do so shall result in the contractor accepting all liabilities for the material.

BASE BID ITEMS

Item 1: Mobilization - Measurement for this item shall be lump sum basis. This work shall include the contractor Temporary Facilities and Controls, Demonstration and Training costs. This work shall cover all contractors cost for materials, equipment, and labor and incidentals and for all the work to complete the work as shown on the plans and specification herein and conforming to the provisions of these items and no additional compensation will be allowed therefore.

Item 2: Demolition - Measurement for this item shall be on a lump sum basis. This work shall cover all Contractor demolition costs for the demolition effort needed to complete the Project such as but not limited to demolition of the existing building structures, concrete foundations, asphalt, concrete flat work, tree, fence, underground utilities, utilities and all disposal including gravel off-haul, equipment and labor, and incidentals to complete the work as shown on the plans and specification herein and conforming to the provisions of this item and no additional compensation will be allowed therefore.
Item 3: Site Grading - Measurement for this item shall be on a lump sum basis. This work shall be performed as shown on the plans and as required by the specifications. This work shall cover all Contractor costs for materials, equipment, labor equipment, and incidental, and for doing all the work involved in site grading work but not limited to underground utilities installation, trenching and backfilling, building pad construction, soil compaction erosion control measures and storm-water piping and incidentals to complete the work as shown on the plans and specification herein and conforming to the provisions of this item and no additional compensation will be allowed therefore.

Item 4: Pre-Engineered Structure – Measurement for this item shall be on a lump sum basis. This work shall be performed as shown on the plans and as required by the specifications. This work shall cover all Contractor costs for materials, equipment, labor equipment, and incidental, and for doing all the work involved in Pre-Engineered Structure work but not limited to plumbing, electrical, communication, roofing, siding, interior walls, exterior and interior doors and windows, fire protection system, architectural woodwork, HVAC system, rough carpentry, thermal and moisture protection, glazing, hardware, hollow metal doors and frames, bathroom and kitchen accessories and hardware, finishes and incidentals to complete the work as shown on the plans and specification herein and conforming to the provisions of this item and no additional compensation will be allowed therefore.

Item 5: Concrete – Measurement for this item shall be on a lump sum basis. This work shall be performed as shown on the plans and as required by the specifications. This work shall cover all Contractor costs for materials, equipment, labor equipment, and incidental, and for doing all the work involved in concrete work but not limited to foundation excavation, forming, reinforcement and placing; slab-on-grade, forming, drain rock, vapor barrier, reinforcement, placing and finish; curb and gutter, forming and placing and incidentals to complete the work as shown on the plans and specification herein and conforming to the provisions of this item and no additional compensation will be allowed therefore.

Item 6: Paving – Measurement for this item shall be on a lump sum basis. This work shall be performed as shown on the plans and as required by the specification. This work shall cover all Contractor costs for materials, equipment, labor equipment, and incidental, and for doing all the work involved in paving work but not limited to soil compaction, aggregate base, placement and compaction, paving compaction as shown on the plans and specification herein and conforming to the provisions of this item and no additional compensation will be allowed therefore.

Item 7: Surveying – Measurement for this item shall be on a lump sum basis. This work shall be performed as shown on the plans and as required by the specification. This work shall cover all Contractor costs for materials, equipment, labor equipment, and incidental, and for doing all the work involved in surveying and construction surveying but not limited to preparing a corner record map and filing said map per Napa County standards as shown on the plans and specification herein, confirming horizontal and vertical existing utility locations, and conforming to the provisions of this item and no additional compensation will be allowed therefore.
ADD ALTERNATE BID ITEMS

Item 1: Backup Generator - Measurement for this item shall be on a lump sum basis. This work shall be performed as shown on the plans and as required by the specification. This work shall cover all Contractor costs for materials, equipment, labor equipment, and incidental, and for doing all the work involved in installing a backup generator but not limited to electrical, buying the unit, and warranty as shown on the plans and specification herein and conforming to the provisions of this item and no additional compensation will be allowed therefore. Work shall be performed as shown on the plans and required by the specifications.

Item 2: Monument Sign with Lighting – Measurement for this item shall be on a lump sum basis. This work shall be performed as shown on the plans and as required by the specification. This work shall cover all Contractor costs for materials, equipment, labor equipment, and incidental, and for doing all the work involved in installing monument sign with lighting, wood sign with posts, painted, matching County Fire Department Standard as shown on the plans and specification herein and conforming to the provisions of this item and no additional compensation will be allowed therefore.

Item 3: Hose Drying Rack - Measurement for this item shall be on a lump sum basis. This work shall be performed as shown on the plans and required by the specifications. This work shall cover all Contractor costs for materials, equipment, labor equipment, and incidental, and for doing all the work involved in construction of a Hose Drying Rack of galvanized steel and angle framing with Trex decking set in concrete footings as shown on the plans and specification herein and conforming to the provisions of this item and no additional compensation will be allowed therefore. Dimensions per A-101. Engineering is Design/Build.

Item 4: Ground Mounted 25’ Flag Pole with Lighting – Measurement for this item shall be on a lump sum basis. This work shall be performed as shown on the plans and as required by the specification. This work shall cover all Contractor costs for materials, equipment, labor equipment, and incidental, and for doing all the work involved in installing a 25’ flag pole with lighting not limited to flag pole and electrical, buying the unit, as shown on the plans and specification herein and conforming to the provisions of this item and no additional compensation will be allowed therefore. Work shall be performed as shown on the plans and required by the specifications.

Item 5: Fire Suppression System with Fire Alarm - Measurement for this item shall be on a lump sum basis. This work shall be performed as shown on the plans and as required by the specification. This work shall cover all Contractor costs for materials, equipment, labor equipment, and incidental, and for doing all the work involved in installing fire suppression system with fire alarm but not limited to piping, electrical, buying the systems, and warranty as shown on the plans and specification herein and conforming to the provisions of this item and no additional compensation will be allowed therefore. Work shall be performed as shown on the plans and required by the specifications.
Item 6: Storefront Window - Measurement for this item shall be on a lump sum basis. This work shall be performed as shown on the plans and as required by the specification. This work shall cover all Contractor costs for materials, equipment, labor equipment, and incidental, and for doing all the work involved in installing a storefront window but not limited to buying the unit, and warranty as shown on the plans and specification herein and conforming to the provisions of this item and no additional compensation will be allowed therefore. work shall be performed as shown on the plans and required by the specifications.

Item 7: Cast Aluminum Building Identification Letters, 9" High, Mounted to face of Wall Panels - Measurement for this item shall be on a lump sum basis. This work shall be performed as shown on the plans and as required by the specification. This work shall cover all Contractor costs for materials, equipment, labor equipment, and incidental, and for doing all the work involved in installing monument cast aluminum building identification letters, 9" high, mounted to face of wall panels as shown on the plans and specification herein and conforming to the provisions of this item and no additional compensation will be allowed therefore.

Item 8: Aluminum Sectional Overhead Door in lieu of Steel Sectional Overhead Door - Measurement for this item shall be on a lump sum basis. This work shall be performed as shown on the plans and as required by the specification. This work shall cover all Contractor costs for materials, equipment, labor equipment, and incidental, and for doing all the work involved in installing aluminum sectional overhead door in lieu of steel sectional overhead door with electrical connections on the plans and specification herein and conforming to the provisions of this item and no additional compensation will be allowed therefore.

Item 9: Driveway Site Lighting at West Property Edge - Measurement for this item shall be on a lump sum basis. This work shall be performed as shown on the plans and as required by the specification. This work shall cover all Contractor costs for materials, equipment, labor equipment, and incidental, and for doing all the work involved in installing driveway site lighting at West property edge with electrical work as shown on the plans and specification herein and conforming to the provisions of this item and no additional compensation will be allowed therefore.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

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

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

2. Purpose: After bidding, substitutions will only be considered where Owner will receive benefit or because specified materials are no longer available due to no fault of Contractor.
   a. Owner benefits either from a Contractor proposed reduction of the Contract amount or from a reduction in Contract time based on acceptance of proposed substitution.
   b. List proposed cost or time reductions on request for substitution.
   c. Requests not including a proposed cost or time reduction will not be considered unless Contractor submits supporting information indicating specified materials are not available.

B. Related Sections:
   1. Section 01 60 00: Product requirements.

1.2 SUBSTITUTIONS

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

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

2. After initial 35-day period, requests will be considered only when a product becomes unavailable through no fault of Contractor; more than one request for substitution will be considered if necessary.
B. Submit each request with sequentially numbered “Substitution Request Transmittal” acceptable to Owner and Architect; submit separate request for each product and support each request with:
   1. Product identification with manufacturer’s literature and samples where applicable.
   2. Name and address of similar projects on which product has been used, and date of installation.

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

D. Submit data relating to changes in construction schedule.

E. Note effect of substitution on other work, products, or separate contracts.
   1. Note if acceptance of substitution could require revision of Contract Documents, Drawings, details, or Specifications.

F. Include accurate cost data comparing proposed substitution with product and amount of net change in Contract price.
   1. Include costs to other contractors and costs for revisions to Drawings, details, or Specifications.

G. Substitutions will not be considered for acceptance when:
   1. They are indicated or implied on submittals without a formal request from Contractor.
   2. They are requested directly by a subcontractor or supplier.
   3. Acceptance will require substantial revision of Contract Documents.

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

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

1.3 CONTRACTOR'S REPRESENTATION

A. Requests constitute a representation that Contractor:
   1. Has investigated proposed product and determined it meets or exceeds, in all respects, specified product.
   2. Will provide same warranty or longer warranty for substitution as for specified product.
   3. Will coordinate installation and make other changes that may be required for Work to be complete in all respects.
   4. Waives claims for additional costs that subsequently become apparent.
   5. Will pay costs of changes to Contract Documents, Drawings, details, and Specifications required by accepted substitutions.
1.4 ARCHITECT'S DUTIES

A. Review Contractor's requests for substitutions with reasonable promptness.
   1. Architect will recommend that Owner accept or reject substitution request.
   2. Upon request, Architect will provide cost for changes to Contract Documents, Drawings, details and Specifications required for substitutions.

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

END OF SECTION

ATTACHMENT: REFER TO ATTACHED PRODUCT SUBSTITUTIONS FORM.
MATERIAL/PRODUCT SUBSTITUTION REQUEST

To: Shah Kawasaki Architects

Project Name: CARNEROS VOLUNTEER FIRE STATION NO. 210

Request Number: ________________________________

A. We hereby submit for your consideration the following product instead of the specified item:

1. Section __________ Sub-Article _________________________________
2. Specified Item _________________________________________________
3. Proposed Substitution (Manuf., Type, Model, etc.) __________________
   __________________________________________________________________

B. Complete following:

1. We propose to provide Owner cost credit (including costs for changes by other trades) of
   __________________________________________________________________

does this substitution offer earlier delivery or less construction time? Yes No
   a. If yes, how much and why? ____________________________ (hours/days/weeks)

2. How does this substitution affect any dimensions, layout, or details of other trades as shown on Drawings?

3. Has this substitution been coordinated with remainder of Project?

4. What are the specific differences between this substitution and specified item?
   __________________________________________________________________
   __________________________________________________________________

5. What impact does this product have on CALGreen requirements?
   __________________________________________________________________

C. Attach following items as applicable. Check if attached.

1. Manufacturers’ technical data. ___
2. Laboratory test or performance results. ___
3. Drawings and wiring diagrams of proposed product. ___
4. Drawings and description of changes required by other trades. ___
5. Samples. ___
6. Manufacturer’s guarantee and maintenance instructions. ___
7. CALGreen submittal information. ___

D. The undersigned agrees to pay for all design, testing, changes in Contract Documents, and construction as result of acceptance of this substitution, at no additional cost to Owner.

E. Submitted by (Firm) ________________________________

Signature ________________________________ Date ____________________
PART 1 - GENERAL

1.1 SUMMARY

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

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

1.2 MINOR CHANGES IN WORK

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

1.3 REQUESTS FOR INFORMATION

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1.5 ALLOWANCES

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

1. Include installation cost in purchase amount only when indicated as part of allowance.
2. When requested, prepare explanations and documentation to substantiate amounts claimed for work done based on allowances.

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

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

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

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

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

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

1.6 CONSTRUCTION CHANGE DIRECTIVE

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

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

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

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

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

1.7 CHANGE ORDER PROCEDURES

A. Contractor shall be directed to proceed with Work upon Owner’s approval of Proposal.

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

C. Amounts of each Change Order shall be indicated in each Request for Payment including payment status for each individual Change Order.
PART 1 - GENERAL

1.1 SUMMARY

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

1. Construction progress schedules.
2. Schedule of values.
3. Product data and manufacturer’s literature.
4. Shop drawings.
5. Samples.
7. Design/build procedures.

B. Related Requirements:

1. Section 01 40 00: Test reports, manufacturer's field reports, and mock-ups.
2. Section 01 70 00: Manufacturers’ instructions.
3. Section 01 77 00: Closeout requirements including Project Record Documents.
4. Section 01 78 00: Warranties.

1.2 GENERAL SUBMITTAL PROCEDURES

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

1. Identify Project, Contractor, subcontractor, major supplier.
   a. Attach sequential identification number for each new submittal.
   b. Identify each resubmittal using original submittal number and sequential identification clearly indicating item is resubmitted.

2. Provide complete packages including product data, shop drawings, samples, qualifications, and other required information.
   a. Incomplete submittals will be returned unreviewed.

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

4. Identify deviations from Contract Documents.

5. Provide space for Contractor and Architect review stamps.
6. Contractor: Review and stamp submittals from subcontractors prior to submitting to Architect.
   a. Review submittals and indicate where conflicts occur with Contract Documents and with work of other subcontractors.
   b. Return submittals that vary significantly from Contract Documents for correction and resubmittal prior to submitting to Architect.
   c. Submittals that vary significantly from Contract Documents and that fail to indicate thorough Contractor review prior to submission to Architect will be returned without review.
   d. Cursory review and stamping of subcontractor submittal by Contractor shall not be acceptable.

7. Resubmittals: Limited to 25% maximum of all submittals and 3rd submittals shall be limited to 5%.
   a. If additional submittal reviews beyond this are required, Contractor shall be required to reimburse County for additional reviews by Design Team.

B. Initial Schedules: Submit initial progress schedule and schedule of value in duplicate within 15 working days after award of Contract.
   1. After review by Owner and Architect revise and resubmit where required.

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

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

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

1.3 TYPES OF SUBMITTALS

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

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

C. Schedule of Values: Submit Schedule of Values indicating division of Work, subcontractors to perform work, products being used, and values attributed to each to inform Design Team and Owner.
D. Action Submittals: Submittals relating to product data and manufacturer’s literature, shop drawings, and samples for Design Team review and comment; do not begin fabrication, delivery, or installation until Design Team review is complete.

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

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

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

1. Calculations: Do not submit calculations unless specifically required by Contract Documents; submit calculations required by applicable authorities directly to applicable authorities.
   a. Submit certification by qualified professional indicating required calculations have been prepared and work conforms to Contract Documents and applicable codes and regulations.

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

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

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

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Submit construction progress schedule with separate item for each major trade and operation, identifying first day of each week.

1. Show complete sequence of construction by activity, identifying work of separate stages and logically grouped activities.

2. Show projected percentage of completion for each item of Work as of time of each progress Application for Payment.

3. “Submittal Schedule”: Show Contractor submittal dates required for shop drawings, product data, and samples, and product delivery dates; deliver to Architect per approved “Submittal Schedule.”
   a. “Submittal Schedule” may be incorporated into construction progress schedule or may be separate, Contractor option.
b. Architect’s Review Period: Architect will be expedient in review however, Contractor shall schedule submittals recognizing possibility Architect may reject and may require resubmittal.

c. Contract extension shall not be allowed for Contractor’s failure to properly schedule submittals to allow for Architect requiring resubmittal.

B. Progress Schedule Format: Submit both horizontal bar chart and network analysis system using critical path method as approved by Owner.

1. Submit revised progress schedules with each Application for Payment reflecting changes since previous submittal, not less than monthly.

1.5 SCHEDULE OF VALUES

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

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

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

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

1.6 PRODUCT DATA/MANUFACTURERS’ LITERATURE

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

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

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

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

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

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

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

B. Distribution: After review, reproduce and distribute.

1.8 SAMPLES

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

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

C. Coordinate submittal of different categories for interfacing work.

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

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

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

F. Sizes: Provide following sizes unless otherwise specified.

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

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

1.9 MANUFACTURERS’ CERTIFICATES

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

1.10 DESIGN/BUILD PROCEDURES

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

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

a. In general Design/Build includes design by licensed professionals with expertise beyond that allowed under standard architectural licensure, and outside of scope of work of other design professionals on the design team.
2. Contractor may be required to provide design services as part of construction for specific work defined as design or design-build where special expertise is required that is not available in the Project design team such as:

   a. Pre-engineered building design.

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

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

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

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

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

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

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

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

      b. Plans, specifications, and calculations shall be acceptable to Owner, Owner’s Representative, and applicable authorities.

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

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

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

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

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

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

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

B. Related Sections:

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

1.2 COORDINATION

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

1. Coordinate construction operations that depend on each other for proper installation, connection, and operation.
2. Coordinate work to assure efficient and orderly sequence of installation of construction elements.
3. Make provisions for accommodating items installed by Owner or under separate contracts.

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

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

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

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

1. Follow routing shown for pipes, ducts, and conduits as closely as possible; make runs parallel with lines of building.
2. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
E. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated. Coordinate locations of fixtures and outlets with finish elements.

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

1.3 SUBMITTALS

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

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

1.4 SUPERVISORY AND ADMINISTRATIVE PERSONNEL

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

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

1.5 PROJECT MEETINGS

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

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

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

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

1. Architect will attend limited meetings and Site visits as included in their Contract.

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

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Comply with CALGreen environmental requirements related to energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality as adopted by the City of Napa.

1. Nonresidential Projects: Comply with specific CALGreen requirements for nonresidential projects as applicable to Project.

1.2 ENVIRONMENTAL REQUIREMENTS

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

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

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

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

3. Voluntary Tiers: Construction team is encouraged to work with Owner and Design Team to achieve enhanced Voluntary Tier levels by incorporating additional measures as defined in CALGreen Appendixes.

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

   b. Construction team is required to achieve Mandatory Measures and to achieve as much as possible without unacceptable cost impact or schedule impact as considered by Owner.

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

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

2. Water Efficiency and Conservation: Comply with requirements for both indoor and outdoor water use.
3. Material Conservation and Resource Efficiency:
   a. Nonresidential Projects: Provide weather-resistant exterior wall and foundation envelope including prevention of landscape irrigation spray on structures (if any) and prevent water intrusion at exterior entries.
   b. Construction Waste: Provide construction waste management plan as defined by CALGreen with at least 50% of construction waste diverted from landfill by recycling or salvage for reuse.
   c. Nonresidential Projects Building Maintenance and Operation: Provide for commissioning requirements as required by CALGreen including but not limited to testing, documentation and training, testing and adjusting.

4. Nonresidential Projects Environmental Quality:
   a. Mechanical Equipment Pollution Control: Cover duct and related air distribution component openings to prevent dust and debris accumulation.
   b. Finish Material Pollution Control: Comply with CALGreen requirements for volatile organic compound (VOC) emissions including but not necessarily limited to following (as applicable):
      1) Adhesives, sealants, and caulks.
      2) Paints and coatings.
      3) Carpet systems including carpet, carpet cushion, and adhesives.
      4) Resilient flooring systems.
      5) Composite wood products formaldehyde limitations.
   c. Filters: Comply with requirements for mechanically ventilated buildings to have air filtration media for outside and return air prior to occupancy.
   d. Environmental Tobacco Smoke (ETS) Control: Comply with CALGreen requirements for ETS.
   e. Interior Moisture Control: Comply with California Building Code requirements and CALGreen requirements for vapor retarder at concrete slab foundations and capillary break (aggregate base).
   f. Building Material Moisture Content: Do not use water damaged building materials, remove and place wet and high moisture content insulation, and do not enclose wall or floor framing when moisture content exceeds 19%.
   g. Indoor Air Quality: Comply with CALGreen requirements for outside air delivery and carbon dioxide monitoring.
   h. Environmental Comfort: Comply with CALGreen requirements for whole acoustical control and interior sound control.
   i. Outdoor Air Quality: Comply with CALGreen requirements for reduction of greenhouse gases and ozone depletion.

C. Planning and Design: Construction team shall coordinate with Design Team regarding Project Planning and Design methods related to CALGreen requirements related to Project design and shall comply with requirements related to construction.
1.3 QUALITY ASSURANCE

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

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

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

3. Meetings: Discuss CALGreen Goals at following meetings.
   a. Pre-construction meeting.
   b. Pre-installation meetings.
   c. Regularly scheduled job-site meetings.

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

PART 2 - PRODUCTS

2.1 MATERIALS

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

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

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

2.2 SUBSTITUTIONS

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

1. Indicate each proposed substitution complies with CALGreen requirements.

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

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

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

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. This section describes general quality control requirements.
   1. General quality control.
   2. Manufacturers’ field services.
   4. Independent testing laboratory services and inspections.

B. Related Requirements:
   1. Refer to applicable codes and Specifications sections for test requirements.

1.2 QUALITY CONTROL, GENERAL

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

1.3 MANUFACTURER’S FIELD SERVICES

A. When specified in respective Specification sections, require manufacturer or supplier to have qualified personnel provide on-site observations and recommendations.
   1. Observe field conditions, including conditions of surfaces and installation.
   2. Observe quality of workmanship.
   3. Provide recommendations to assure acceptable installation and workmanship.
   4. Where required, start, test, and adjust equipment as applicable.

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

1.4 MOCK-UPS

A. Erect field samples and field mock-ups at locations on site as approved in advance and in accordance with requirements where included in Specifications section.
   1. Test mock-ups requiring special equipment may be erected at location having access to necessary equipment. Coordinate with Architect.

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

C. Approved field samples and mock-ups may be used as part of Project.
1.5 TESTING LABORATORY SERVICES AND INSPECTIONS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. This section describes temporary construction facilities and temporary controls.
   1. Electricity and lighting.
   2. Heat and ventilation.
   3. Water and sanitary facilities.
   5. Temporary enclosures.
   7. Cleaning during construction.
   8. Project identification.
   9. Field offices, telephone service, and storage.
  10. Site waste management.

B. Related Requirements:
   1. Section 01 70 00: Progress cleaning and final cleaning.

C. Provide temporary construction facilities and temporary controls as required to conform to applicable authorities and as required to complete Project in accordance with Contract Documents.
   1. Authorities: Contact governing authorities to establish extent of temporary facilities and temporary controls required by authorities.

1.2 ELECTRICITY AND LIGHTING

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

B. Provide lighting for construction operations.
   1. Permanent lighting may be used during construction; maintain lighting and make routine repairs.

1.3 HEAT AND VENTILATION

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

1.4 WATER AND SANITARY FACILITIES

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

B. Provide and maintain required sanitary facilities and enclosures.
1.5 CONSTRUCTION AIDS

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

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

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

1.6 ENCLOSURES

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

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

1.7 BARRIERS

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

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

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

1.8 CLEANING DURING CONSTRUCTION

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

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

1.9 PROJECT IDENTIFICATION

A. Project Sign: Provide minimum 32 square foot Project identification sign of wood frame and exterior grade plywood construction, painted, with exhibit lettering by professional sign painter.

   1. Design: As furnished by Architect.

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

   3. Erect on site at location established by Architect.

B. Other Signs: Subject to approval of Architect and Owner.
1.10 FIELD OFFICES, TELEPHONE SERVICE, AND STORAGE

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

   1. Meeting Space: In addition, provide space for Project meetings with table and chairs to accommodate minimum six persons.
   
   2. Telephone Service: Provide telephone service to field office.
   
   
   4. Computer: Provide desktop computer system at Project field office with e-mail capacity and software compatible with Architect word processing system; include separate e-mail line and internet capabilities.
     
     a. Digital Camera: Maintain operational digital camera on-site during construction along with software allowing transmission of digital pictures taken on-site via e-mail to Owner and Architect.

B. Cellular Telephone Service: Provide each on-site Project Manager with cellular telephone to allow Owner and Architect on-site contact during construction operations.

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

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

   1. Maintain adequate space for organized storage and access.
   
   2. Provide lighting for inspection of stored materials.

1.11 SITE WASTE MANAGEMENT

A. Site Waste Management: Comply with applicable regulations for diverting Project waste from landfill; aim for waste management goal of 50% or higher.

   1. CALGreen: Refer to Section 01 35 15 for specific CALGreen requirements related to construction waste.
   
   2. Effect optimum control of solid wastes.
   
   3. Prevent environmental pollution and damage.

B. Reports: Provide as required by applicable authorities.
C. Recycling: Implement recycling program that includes separate collection of waste materials of types as applicable to Project; recycling program to be applied by Contractors and subcontractors.

D. Handling: Keep materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to recycling process.
   1. Clean materials contaminated prior to placing in collection containers.
   2. Arrange for collection by or delivery to appropriate recycling center or transfer station that accepts construction and demolition waste for purpose of recycling.

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

1.12 REMOVAL

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

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

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

END OF SECTION
SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

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

B. Related Requirements:

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

1.2 GENERAL PRODUCTS REQUIREMENTS

A. Products include material, equipment, and systems.

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

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

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

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

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

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

2. Named Manufacturers and Named Products: Select products of any named manufacturer meeting Specifications for products specified by naming one or more products or manufacturers.
3. Substitutions for Named Manufacturers and Named Products: Submit request for substitution for products and for manufacturers not specifically named where products or manufacturers are named in Specifications.

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

1.3 SUBMITTALS

A. Product List: Within 15 days after award of Contract, submit to Owner and Architect a complete list of major products proposed for installation, with name of manufacturer, trade name, and model.

1. Tabulate products by Specification number and title.

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

1.4 QUALITY ASSURANCE

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

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

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

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

1. Seismic Anchors: Conform to code requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

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

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

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

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

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

F. Arrange storage to provide access for inspection; periodically inspect to assure products are undamaged and are maintained under required conditions.
G. Provide equipment and personnel to handle products by methods to prevent soiling and prevent damage.

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

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

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

1.1 SUMMARY

A. This section describes execution requirements.

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

B. Related Requirements:

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

1.2 INSTALLER QUALIFICATIONS

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

1.3 EXAMINATION

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

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

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

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

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

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

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

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

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

1.5 INSTALLATION

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

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

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

1. Make vertical work plumb and horizontal work level.

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

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

E. Conduct operations so no part of Work is subject to damaging operations or loading in excess of that expected during normal conditions.

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

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

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

1.6 CLEANING

A. Cleaning During Construction: Specified in Section 01 50 00 - Temporary Facilities and Controls.
B. Progress Cleaning: Keep installed areas clean using cleaning materials specifically recommended by manufacturers of product being cleaned. Where not otherwise recommended use nontoxic materials that will not damage surfaces.

1. Remove debris from concealed spaces before enclosing space.

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

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

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

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

3. Clean site; sweep paved areas.

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

1.7 PROTECTION

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

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

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

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

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

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

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

B. Related Requirements:

1. Section 01 50 00: Temporary facilities and controls.

1.2 SUBMITTALS

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

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

B. Request shall include:

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

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

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

D. Submit written notice to Architect designating date and time work will be uncovered.
PART 2 - PRODUCTS

2.1 MATERIALS

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

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

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

PART 3 - EXECUTION

3.1 INSPECTION

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

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

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

3.2 PREPARATION

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

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

B. Protect other portions of Project from damage.

3.3 PERFORMANCE

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

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

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

1. Weather-exposed or moisture resistant elements.

2. Sight-exposed finished surfaces.

C. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.
D. Restore work that has been cut or removed; install new products to provide completed Work in accordance with requirements of Contract Documents.

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

F. Refinish entire surfaces as necessary to provide even finish to match adjacent finishes:
   1. For continuous surfaces, refinish to nearest intersection.
   2. For an assembly, refinish entire unit.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. This section describes Contract closeout procedures.
   1. Substantial completion.
   2. Final completion.
   3. Project record documents.
   4. Material and finish data.
   5. Operation and maintenance data.

B. Related Requirements:
   1. Section 01 78 00: Warranties.
   2. Section 01 79 00: Demonstration and training.

1.2 SUBSTANTIAL COMPLETION

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

B. When Contractor considers the Work or a designated portion thereof is substantially complete, submit written notice, with list of items to be completed or corrected.
   1. List ("Punch List"): Format pre-approved by Owner and Architect; tabular form with each space listed required.

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

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

E. Contractor shall remedy deficiencies and send a second written notice of substantial completion. Architect will reinspect Work.
   1. Contractor shall pay for Architect's time and direct expenses where more than one Substantial Completion inspection is required.

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

1.3 FINAL COMPLETION

A. When Work is complete, submit written certification indicating:
   1. Work has been inspected for compliance with Contract Documents.
2. Work has been completed in accordance with Contract Documents and deficiencies listed (in “Punch List”) with Certificate of Substantial Completion have been corrected.

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

4. Work is complete and ready for final inspection.

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

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

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

1.4 PROJECT RECORD DOCUMENTS

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

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

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

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

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

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

1.5 MATERIAL AND FINISH DATA

A. Provide data for primary materials and finishes.

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

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

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

1. Trade names, model, or type numbers.
2. Cleaning instructions.
3. Product data.
1.6 OPERATION AND MAINTENANCE DATA

A. Provide data for:

1. Electrically operated items.
2. Mechanical equipment and controls.
3. Electrical equipment and controls.

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

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

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

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

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

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Warranties: Compile warranties required by Contract Documents including incidental warranties.

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

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

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

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

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

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

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

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

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

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

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

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

A. Special Warranty and Extended Correction Period Forms: Provide duplicate copies, notarized or on Contractor and Manufacturer's letterhead without conditions or exceptions to requirements specified.
   1. Assemble documents executed by subcontractors, installers, suppliers, and manufacturers.
   2. Provide table of contents and assemble in binder with durable plastic cover, clearly identified regarding extent of contents.

B. Manufacturer Warranty Forms: Use manufacturer's standard forms unless otherwise directed in Contract Documents; completed form shall not detract from or confuse interpretations of Contract Documents.
   1. Manufacturer's authorized representative shall sign manufacturer warranties.
   2. Subcontractor and installer shall countersign warranty where specified.

C. Submit final warranties prior to final application for payment.
   1. For equipment put into use with Owner's permission during construction, submit within ten days after first operation.
   2. For items of Work delayed materially beyond Date of Substantial Completion, provide updated submittal within ten days after acceptance, listing date of acceptance as start of warranty period.

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

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

1.3 WARRANTIES AND CORRECTION OF WORK DOCUMENTS

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

B. Limitations: Warranties and correction of work requirements are not intended to cover failures that result from:
   1. Unusual or abnormal phenomena of the elements.
   2. Owner's misuse, maltreatment, or improper maintenance of work.
   3. Vandalism after substantial completion.
   4. Insurrection or acts of aggression including war.
C. Related Damages and Losses: Remove and replace work which is damaged as result of failure, or which must be removed and replaced to provide access for correction of work.

D. Reinstatement: After correction of work reinstate warranty or extended correction period for corrected work to date of original expiration, but not less than half original period.

1. Correction of Work Period: The general correction of work period specified shall not be extended by corrective work except to extent required to correct failure and repair or replace materials damaged by failure.

E. Replacement Cost: Replace or restore failing items without regard to anticipated useful service lives where part of correction of work period, extended correction of work period, and special warranty period unless otherwise noted.

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

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide equipment and systems demonstration and instruction in accordance with Contract Documents.

B. Related Sections:
   1. Section 01 31 00: Project management and coordination.
   2. Section 01 77 00: Closeout procedures.

1.2 DESCRIPTION

A. Seminar Agenda and Outline:
   1. Prepare a seminar agenda and outline in consultation and cooperation with Owner. Include following:
      a. Equipment and systems that will be included in seminars.
      b. Name of companies and representatives presenting at seminars.
      c. Outline of each seminar's content.
      d. Time and date allocated to each system and item of equipment.
   2. Submit preliminary seminar agenda and outline for review and comment by Owner.
      a. Revise and resubmit agenda and outline until all seminar requirements have been satisfied and seminar dates and presenters have been finalized.
   3. Submit final seminar agenda and outline no later than eight weeks before date of Acceptance of Work.

B. Seminar Organization:
   1. Contractor’s presentation leaders shall chair seminars.
      a. Coordinate qualification of training personnel, seminar contents, and presentations with Owner.
   2. Coordinate individual presentations and ensure manufacturer’s representatives scheduled to be at training seminars are present.
3. Arrange for presentation leaders familiar with design operation, maintenance and troubleshooting of equipment and systems.
   a. Where one person is not familiar with all aspects of equipment or system; arrange for specialists familiar with each aspect.

4. Coordinate proposed seminar dates with Owner and select mutually agreeable dates.

C. Seminar Content:

1. Architect’s Consultants will explain design philosophy of primary systems.

2. Include following information in presentations dealing with specific systems.
   a. An overview of how system is intended to operate.
   b. Describe design parameters, constrains and operational requirements.
   c. Describe system operation strategies.
   d. Provide information to help in identifying and troubleshooting problems.

3. Include following information in presentations dealing with equipment.
   a. Explanation of how equipment operates.
   b. Recommended preventative and routine maintenance.

D. System Demonstration:

1. Demonstrate operation of equipment and systems when specified in individual technical sections. Include following in demonstration.
   a. Start-up and shut down.
   c. Operation.
   d. Scheduled and preventative maintenance.
   e. Troubleshooting.

2. Demonstration may be conducted at time of original starting with Owner’s prior approval.

E. Seminar and Demonstration Questions:

1. Be prepared to answer questions raised by Owner’s personnel at demonstrations and seminars.

2. If unable to satisfactorily answer questions immediately, provide written response within three days.

F. Use manufacturer’s operation and maintenance data as basis of instruction.

END OF SECTION
PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: All labor, materials and equipment and all operations required to complete all formwork as indicated on the drawings; to produce shapes and configurations as shown, as required; and as specified herein, including:

1. Forms, shores, bracing, removal and other operations as necessary for all cast-in-place concrete and masonry placed.
2. Setting and securing anchor bolts and other metal items embedded in concrete into formwork, using materials and layouts furnished and delivered to jobsite as specified under other sections.

B. Related Sections:

1. Pertinent Sections of Division 03 specifying concrete construction.
2. Pertinent Sections of other Divisions specifying work to be embedded in concrete or work penetrating concrete foundations and formwork.

1.2 REFERENCES

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC): Chapter 19 Concrete.

B. American Concrete Institute (ACI) 347 "Recommended Practice for Concrete Formwork”.

C. American Plywood Association (APA) “Concrete Forming Guide”.

D. West Coast Lumberman Inspection Bureau (WCLIB) “Standard Grading Rules for West Coast Lumber”.

E. ACI SP-066 “ACI Detailing Manual”.

F. ACI 301 “Specifications for Structural Concrete”.

G. Concrete Reinforcing Steel Institute (CRSI) “Manual of Standard Practice”.

1.3 DESIGN REQUIREMENTS

A. Design, engineer, and construct formwork, shoring and bracing to conform to design and code requirements, resist imposed loads; resultant concrete to conform to required shape, line and dimension.
1.4 SUBMITTALS

A. Limitation of review: Structural Engineer's review will be required only where specifically requested for general architectural applications and features only. Contractor is responsible for structural stability, load-resisting characteristics and sufficiency of form work design.

1.5 QUALITY ASSURANCE

A. General: All form materials shall be new at start of work. Produce high quality concrete construction. Minimize defects due to joints, deflection of forms, roughness of forms, nonconforming materials, concrete or workmanship.

B. Reuse of Forms: Plywood forms may be reused, if thoroughly cleaned of all dirt, mortar, and foreign materials, and undamaged at edges and contact face. Reuse shall be subject to permission from the Architect without exception, and issued in writing. Reuse of any panel which will produce a blemish on exposed concrete, will not be permitted.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Form Materials:

1. Non-Exposed Surface Formwork Facing: Forms for concrete which is not exposed to view, may be of plywood as specified for exposed surfaces, or square edge 1x nominal Douglas Fir, Construction Grade, S4S.

2. Exposed Surface Formwork Facing:
   a. Forms for all exterior and interior concrete flat surfaces unless otherwise specified as board formed shall be new Douglas Fir Plywood (APA) ply, 5/8-inch, B-B Plyform, Class 1, Exterior Type, oiled and edged and edge-sealed conforming to U.S. Product Standard PS 1 in large sheet sizes to achieve joint patterns shown.
   b. All exposed concrete edges shall be chamfered 3/4” minimum or as noted on the drawings.

3. Exposed Surface Formwork - Special Pattern Form Liner:
   a. Forms for all exterior and interior concrete flat surfaces indicated shall be as designated by Architect.

B. Earth Forms: Allowed, subject to soil standing in excavations without ravel or caving.

C. Form Release Agent: Spray-on compound, not affecting color, bond or subsequent treatment of concrete surfaces. Maximum VOC content shall comply with local requirements and California Green Building Code.

D. Accessories: Types recommended by manufacturers or referenced standards to suit conditions indicated;
1. Anchors, spacers, void in-fill materials: sized to resist imposed loads.
2. Form Ties: Prefabricated rod, flat band, or wire snap ties with 1” break-back or threaded internal disconnecting type with external holding devices of adequate bearing area. Ties shall permit tightening and spreading of forms and leave no metal closer than 1” to surface.

E. Corner Chamfers and Rustications: Filleted, wood strip or foam type; sizes and shapes as detailed, or 3/4 x 3/4 inch size minimum if not detailed; maximum possible lengths.

F. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

G. Foam Block Formwork: For use only where specified on drawings to create void space under or within concrete. ASTM D6817. 1 pound per cubic foot maximum density. 10 pounds per square inch minimum compressive strength at 10% deformation. 3.5 pounds per square inch minimum compressive resistance at 1% deformation. 8 pounds per square inch minimum compressive resistance at 5% deformation. InsulFoam Geofoam EPS15, or equivalent.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Inspect the substrate and the conditions under which concrete formwork is to be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected. Commencement of work indicates acceptance of substrates and conditions.

B. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

A. If natural soil or compacted fill can be accurately cut and maintained, foundations and grade beams may be poured against earth without forming. Provide positive protection of trench top corners.

B. Maintain earth forms free of water and foreign materials.

3.3 ERECTION – FORMWORK

A. General: Construct formwork in accordance with calculations, and recommendations of Chapter 3 of ACI 347. Construct forms to the sizes, shapes, lines and dimensions shown, and as required to obtain accurate alignment, location, grades, level and plumb work in finished structure. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications,
reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required. Use selected materials to obtain required finishes.

1. Construct cambers specified in concrete members and slabs in the formwork.
2. Schedule the work and notify other trades in ample time so that provisions for their work in the formwork can be made without delaying progress of the project. Install all sleeves, pipes, etc. for building services systems, or other work. Secure information about and provide for all openings, offsets, recessed nailing blocks, channel chases, anchors, ties, inserts, etc. in the formwork before concrete placement.
3. Deflection: Formwork and concrete with excessive deflection after concrete placement will be rejected. Excessive deflection is that which will produce visible and noticeable waves in the finished concrete.
4. Measure formwork for elevated structural slabs, columns, wall elevations points of maximum camber and submit in writing to the Architect/Engineer prior to placing concrete.

B. Formwork Construction: Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301. Uniform, substantial and sufficiently tight to prevent leakage of concrete paste, readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials. Tie, brace, shore, and support to insure stability against pressures from any source, without failure of any component part and without excessive deflection. Solidly butt joints and provide backup material at joints as required to prevent leakage and fins.

C. Provide all openings, offsets, inserts, anchorages, blocking, and other features of the work as shown or required. See INSERTS, EMBEDDED PARTS, AND OPENINGS for detailed requirements.

D. Warped, checked, or scuffed forms will be rejected.

E. Maintain membranes, reinforcing and other work free of damage; protect with plywood runway boards or other positive, durable means.

F. Align joints and make watertight. Keep form joints to a minimum.

G. Provide fillet and chamfer strips on external corners of exposed locations and as indicated to form patterns in finished work. Extend patterns around corners and into alcoves, on backs of columns and similar locations not otherwise shown.

1. Produce beveled, smooth, solid, unbroken lines, except as otherwise indicated to conform to patterns.
2. Form corners and chamfers with 3/4 inch x 3/4 inch strips, unless otherwise indicated, accurately formed and surfaced to produce uniformly straight lines and tight edge joints. Extend terminal edges to required limit and miter chamfer at changes in direction.

H. Unexposed corners may be formed either square or chamfered.
I. Ties and Spreaders: Arrange in a pattern acceptable to the Architect when exposed. Snap-ties may be used except at joints between pours where threaded internal disconnecting type shall be used.

J. Coordinate this section with other sections of work that require attachment of components to formwork.

K. Reglets and Rebates: Accurately locate, size, and form all reglets and rebates required to receive work of other trades, including flashing, frames, and equipment.

3.4 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer’s recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not allow excess form coating material to accumulate in the forms or to come into contact with reinforcement or surfaces which will be bonded to fresh concrete.

D. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork will be rejected.

E. Leave no residue or stain on the face of the concrete, nor affect bonding of subsequent finishes or work specified in other sections.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

1. Provide openings in concrete formwork to accommodate work of other sections including those under separate contracts (if any). Size and location of openings, recesses and chases shall be in accordance with the section requiring such items. Accurately place and securely support items to be built into forms.

B. Construction Joints: Construct and locate generally as indicated on Drawings and only at locations approved by Structural Engineer, so as not to impair the strength of the structure. Form keys in all cold joints shown or required.

C. Locate and set in place items that will be cast directly into concrete.

D. Rough Hardware and Miscellaneous Metal: Set inserts, sleeves, bolts, anchors, angles, and other items to be embedded in concrete. Set embedded bolts and
sleeves for equipment to template and approved shop drawings prepared by trades supplying equipment.

E. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

F. Wood Inserts and Nailers: Provide approved preservative-treated lumber. Set all required nailing blocks, grounds, and other inserts as required to produce results shown. Wood plugs shall not be used.

G. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

H. Piping: Do not embed piping in structural concrete unless locations specifically approved by Structural Engineer.

I. Conduit: Place conduit below slabs-on-grade and only as specifically detailed on structural drawings. Minimum clear distance between conduits shall be 3 diameters. Location shall be subject to Engineer's written approval and shall not impair the strength of the structure.

J. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

   1. Provide openings for the introduction of vibrators at intervals necessary for proper placement.
   2. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

K. Install Form Liner inserts in accordance with manufacturer's recommendations, to produce patterns and textures indicated.

L. Install waterstops in accordance with manufacturer's recommendations to provide continuous waterproof barrier.

3.6 FORM CLEANING

A. Clean forms as erection proceeds, remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

   1. Remove all dirt, chips, sawdust, rubbish, water and foreign materials detrimental to concrete.
   2. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
3.7 FOOTINGS
   A. Verify elevations and provide final excavation required for footings prior to placing of concrete.

3.8 EQUIPMENT BASES
   A. Form concrete bases for all mechanical and electrical equipment in accordance with approved shop details furnished by other sections.
   B. Sizes and locations as indicated and as required to produce results shown.
   C. Provide coved base for all equipment bases placed on concrete slabs.

3.9 FORMWORK TOLERANCES
   A. Construct formwork to maintain tolerances required by ACI 301.

3.10 FOAM BLOCK FORMWORK
   A. Blocks shall be placed on prepared leveling course for level bearing. Place adjacent blocks in tight contact together. Where placed in multiple layers, orient long axis of upper layer at 90° to lower layer, and so forth for subsequent layers. Anchor blocks as required to prevent movement prior to and during concrete placement. Do not expose to hydrocarbons, solvents, or coal tar.

3.11 FIELD QUALITY CONTROL
   A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and to verify that supports, fastenings, wedges, ties, and items are secure.
   B. Do not reuse wood formwork more than 2 times for concrete surfaces to be exposed to view. Do not patch formwork.
   C. Clean and repair surfaces to be re-used in the work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable. Apply new form coating compound material to concrete contact surfaces as specified for new formwork.
   D. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close all joints. Align and secure joints to avoid offsets.

3.12 FORM REMOVAL
   A. Do not loosen or remove forms before minimum curing period has elapsed without employment of appropriate alternate curing methods, approved by the Architect in writing.
B. Remove forms without damage to the concrete using means to insure complete safety of the structure and without damage to exposed beams, columns, wall edges, chamfers and inserts. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Do not remove forms until the concrete has hardened sufficiently to permit safe removal and the concrete has attained sufficient strength to safely support imposed loads. The minimum elapsed time for removal of forms after concrete has been placed shall be as follows:

1. Footings: 7 days minimum. If backfilled immediately, side forms may be removed 24 hours after concrete is placed.

D. Durations listed above are minimums and are subject to extension at the sole judgment of the Architect/Engineer.

E. Reshoring: Reshore members where and if required by Formwork Design Engineer.

F. Do not subject concrete to superimposed loads (structure or construction) until it has attained full specified design strength, nor for a period of at least 14 days after placing.

G. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

3.13 CLEANING

A. Remove excess material and debris associated with this work from the job site.

END OF SECTION
PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Reinforcing steel work for all concrete and masonry work as indicated on the drawings and specified herein.
   2. Coordinate this work with other work affected by these operations, such as forms, electrical work, mechanical work, structural steel, masonry, and concrete.

B. Related Sections:
   1. Pertinent Sections of Division 01 specifying Quality Control and Testing Laboratory services.
   2. Pertinent Sections of Divisions 03 specifying concrete construction.
   3. Pertinent Sections of Divisions 04 specifying masonry construction.
   4. Pertinent Sections of other Divisions specifying work to be embedded in concrete or work penetrating concrete work.

1.2 REFERENCE STANDARDS

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC) Chapter 19 Concrete.

B. American Concrete Institute (ACI) 301 “Specifications for Structural Concrete for Buildings”.

C. ACI 318 “Building Code Requirements for Reinforced Concrete and Commentary”.

D. ACI SP-066 “ACI Detailing Manual”.


F. ASTM A615 “Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement”.

G. ASTM A706 “Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement”.


I. Concrete Reinforcing Steel Institute (CRSI) - “Manual of Standard Practice”.

03 20 00 - 1 Concrete Reinfrocing
1.3 SUBMITTALS

A. Submit in accordance with pertinent sections of Division 01 specifying submittal procedures. Submit for review prior to fabrication.

B. Limitation of Review: Structural Engineer's review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents. The General Contractor shall review and approve shop drawings prior to submittal to the Architect/Engineer.

C. Shop Drawings: Show complete fabrication and placing details of all reinforcing steel. Comply with requirements of ACI SP-66. Include:

1. Bar sizes and schedules;
2. Shapes of bent bars, layout and spacing of bars, location of splices.
3. Stirrup spacing, arrangements and assemblies,
5. Wall elevations corresponding to elevations shown in Contract Documents.

D. Product Data: Submit manufacturer's product data, specifications, location and installation instructions for proprietary materials and reinforcement accessories. Provide samples of these items upon request.

E. Certificates: Submit all certifications of physical and chemical properties of steel for each heat number as manufactured, including location of material in structure as specified below in Article titled QUALITY ASSURANCE. All materials supplied shall be tagged with heat numbers matching submitted Mill Test Report analyses.

F. Samples: Provide to the Owner's Testing laboratory as specified in Article SOURCE QUALITY CONTROL.

1.4 QUALITY ASSURANCE

A. Perform work of this Section in accordance with the CRSI “Manual of Standard Practice”, CRSI “Placing Reinforcing Bars”, ACI 301, and ACI 318.

B. Requirements of Regulatory Agencies, refer to pertinent Sections of Division 01 and CBC.

C. Certification and Identification of Materials and Uses: Provide Owner's Testing Agency with access to fabrication plant to facilitate inspection of reinforcement. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection and all material identification/test information listed below.
1. Provide manufacturer’s Mill Test Reports for all materials. Include chemical and physical properties of the material for each heat number manufactured. Tag all fabricated materials with heat number.

2. Provide letter certifying all materials supplied are from heat numbers covered by supplied mill certificates. Include in letter the physical location of each grade of reinforcing and/or heat number in the project (i.e. foundations, walls, etc.).

3. Unidentified Material Tests: Where identification of materials by heat number to mill tests cannot be made, Owner’s Testing Agency shall test unidentified materials as described below.

D. Testing and Inspection: Tests and Inspections required by Independent Testing Agency are specified below in Articles SOURCE QUALITY CONTROL and FIELD QUALITY CONTROL. Duties and limitations of Independent Testing Agency, test costs and test reports in conformance with pertinent Sections of Division 01.

1.5 DELIVERY, STORAGE AND HANDLING

A. Comply with pertinent requirements of Division 01.

B. Deliver reinforcement to project site in bundles marked with durable tags indicating heat number, mill, bar size and length, proposed location in the structure and other information corresponding with markings shown on placement diagrams.

C. Handle and store materials above ground to prevent damage, contamination or accumulation of dirt or rust.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Reinforcing Steel: Deformed billet steel bars, ASTM A706 Grade 60 or ASTM A615 Grade 60.

1. Welded reinforcement shall be ASTM A706, or A615 meeting carbon requirements of AWS D1.4. Welding shall conform with AWS D1.4.

2. All reinforcement to be unfinished.

3. ASTM A615 reinforcement at special structural concrete walls, concrete coupling beams, and special concrete moment frames shall have maximum yield stress of 78,000 psi and the tensile strength shall be greater than 125% of the actual yield strength. Test ASTM A615 reinforcement for conformance to these criteria prior to fabrication and/or installation.


C. Tie Wire: No. 16 AWG or heavier, black annealed.

D. Concrete Blocks: On-grade conditions only, as required to support reinforcing bars in position.
E. Reinforcing Supports: Plastic or galvanized steel chairs, bolsters, bar supports, or spacers sized and shaped for adequate support of reinforcement and construction loads imposed during concrete placement, meeting ACI and CRSI standards.

1. For use over formwork: Galvanized wire bar type supports complying with CRSI recommendations. Provide plastic tips where exposed to view or weather after removal of formwork. Do not use wood, brick, or other unacceptable materials.

F. Reinforcement Splice Couplers: For use only where specified on drawings. Submit other locations proposed for use to Engineer for review. "L-Series Bar Lock" Coupler Systems for Splicing Reinforcement Bars, UES ER-0319, by Dayton-Superior Corporation.

2.2 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4), unless specifically shown otherwise. Details not specifically shown or indicated shall conform to SP-066 and specified codes and standards.

1. Accurately shop-fabricate to shapes, bends, sizes, gauges, and lengths indicated or otherwise required.
2. Bend bars once only. Discard bars improperly bent due to fabricating or other errors and provide new material; do not re-bend or straighten unless specifically indicated. Rebending of reinforcement in the field is not allowed.
3. Do not bend reinforcement in a manner that will injure or weaken the material or the embedding concrete.
4. Do not heat reinforcement for bending. Heat-bent materials will be rejected.

B. Unacceptable materials: Reinforcement with any of the following defects will not be permitted in the work.

1. Bar lengths, depths and bends exceeding specified fabrication tolerances.
2. Bends or kinks not indicated on Drawings or final shop drawings.
3. Bars with reduced cross-section due to rusting or other cause.

C. Tag reinforcement with durable identification to facilitate sorting and placing.

D. Shop Fusion Welded Stirrup/Tie/Spiral Cages

1. Shop fusion welding of stirrup/tie/spiral cages is permitted to aid in fabrication and handling. The following requirements shall be met.
2. All reinforcing bars receiving weld shall be ASTM A706.
3. Longitudinal holding wires shall be ASTM A1064.
4. Shop welding shall be performed by machines under a continuous, controlled process.
5. Quality control tests shall be performed on shop-welded specimens and the test results shall be available, upon request, to the Architect/Engineer.
6. Tack welding of reinforcing steel is not permitted.
7. Welding of any type shall not occur at 90°, 135°, or 180° bends. Circular ties and spirals may be shop fusion welded outside of areas with 90°, 135°, or 180° hook bends.
8. Longitudinal bars shall not be welded to stirrups/ties/spirals.

2.3 SOURCE QUALITY CONTROL

A. The Testing Agency, as specified in the Article QUALITY ASSURANCE, will perform the following:

1. Material Testing:
   a. Identified Steel: When samples are taken from bundled steel identified by heat number, matched with accompanying mill analyses as delivered from the mill, supplemental testing of reinforcing steel is not required.
   b. Unidentified Steel: When identification of materials by heat number matched to accompanying mill analyses cannot be made, perform one tensile test and one bend test per each two and one-half tons or fraction thereof for each required size of reinforcing steel. Tests of unidentified steel shall be performed by the Owner's Testing Agency and costs for these tests shall be paid by the Contractor by deductive change order.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Inspect the conditions under which concrete reinforcement is to be placed. Do not proceed with the work until unsatisfactory conditions have been corrected.

B. Coordinate with work of other sections to avoid conflicts or interference. Bring conflicts between reinforcement and other elements to Architect's attention. Resolve conflicts before concrete is placed.

C. Notify Architect, Structural Engineer, and Authority Having Jurisdiction for review of steel placement not less than 48 hours before placing concrete.

3.2 PLACEMENT

A. General: Comply with the specified codes and standards, and Concrete Reinforcing Steel Institute recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

B. Clean bars free of substances which are detrimental to bonding. Maintain reinforcement clean until embedded in concrete.

C. Place reinforcement to obtain the minimum coverages for concrete protection. Do not deviate from required position. Maintain required distance, spacing and clearance between bars, forms, and ground.
D. Location and Support: Provide metal chairs, runners, bolsters, spacers and hangers, as required.

E. Provide additional steel reinforcement as necessary or as directed, to act as spreaders or separators to maintain proper positioning.

F. Tying and Attachment: Securely tie at all intersections and supports with wire. Prevent dislocation or movement during placement of concrete. Direct twisted ends of wire ties away from exposed concrete surfaces.

G. Separate reinforcing from pipes or conduits with approved non-metallic separators. Do not use wood or steel form stakes or reinforcement used as stakes as support for reinforcement.

H. Accommodate placement of formed openings required by other sections.

I. Obstructions:
   1. Where obstructions, block-outs, or penetrations (conduits, raceways, ductwork) prevent continuous placement of reinforcement as indicated, provide additional reinforcing as detailed and as directed by the Structural Engineer to supplement the indicated reinforcement around the obstruction.
   2. Place additional trim bars, ties, stirrups, or other elements as detailed and as directed at all opening, sleeves, pipes or other penetrations through structural elements.

J. Welded Wire Reinforcement: Reinforce slabs with 6"x 6"-W1.4 x W1.4 welded wire reinforcement reinforcing, unless otherwise noted on drawings.
   1. Provide flat sheets only, no rolls. Straighten, cut to required size, and lay out flat in place.
   2. Securely wire-tie reinforcement to other reinforcement at frequent intervals.
   3. Extend reinforcement over supporting beams and walls, and to within 1 inch of edge of slabs, construction joints, and expansion joints.
   4. Support reinforcement in mid-depth of slab.
   5. Lift reinforcement at intervals as slab concrete is placed, ensure proper embedment.

3.3 REINFORCING SPACING AND COVERAGE

A. Spacing: Do not space bars closer than four (4) diameters of the largest of two adjacent bars, except at bar laps, which shall be placed such that a minimum of 2 bar diameters is clear between bars.

B. Where reinforcing in members is placed in two layers, the distance between layers shall not be less than four bar diameters of the largest bar and the bars in the upper layers shall be placed directly above those in the bottom layer, unless otherwise detailed or dimensioned.
C. Coverage of bars (including stirrups and columns ties) shall be as follows, unless otherwise shown:

1. Footings and Mat Foundation: 3 inches to any soil face, 2 inches to top.
2. Slabs (on grade): 2 inches to grade face, 1-1/2 inches to top face.

3.4 DOWELS, SPLICES, OFFSETS AND BENDS

A. Provide standard reinforcement splices at splices, corners, and intersections by lapping ends, placing bars in contact, and tightly tying with wire at each end. Comply with details shown on structural drawings and requirements of ACI 318.

B. Provide minimum 1-1/2 inch clearance between sets of splices. Stagger splices in horizontal bars so that adjacent splices will be 4 feet apart.

C. Laps of welded wire reinforcement shall be at least two times the spacing of the members in the direction lapped but not less than twelve inches.

D. Splices of reinforcement shall not be made at points of maximum stress. Provide splice lengths as noted on the structural drawings, with sufficient lap to transfer the stress between bars by bond and shear.

E. Spacing:

1. Space bars minimum distance specified and all lapped bars 2 bar diameters (minimum) clear of the next bar.
2. Stagger splices of adjacent bars where possible and where required to maintain bar clearance.
3. Request Architect/Engineer review prior to placement for all splices not shown on the drawings.

F. Reinforcement Couplers: Install at all locations indicated. Install couplers in accordance with manufacturer’s recommendations.

3.5 WELDING

A. No reinforcing shall be welded unless specifically indicated. No reinforcing shall be welded without prior approval of the Structural Engineer and the Authority Having Jurisdiction.

B. Only when so approved for use as noted above, all welding shall conform to AWS D1.4, ACI 318 Section 26.6.4, and the following;

1. All welding performed by certified welders.
2. All reinforcement requires preheat prior to welding. All preheat and welding shall be continuously inspected by the Testing Agency.

3.6 MISPLACED REINFORCEMENT

A. Notify Architect/Engineer immediately if reinforcing bars are known to be misplaced after concrete has been placed.
B. Perform no correction or cutting without specific direction. Do not bend or kink misplaced bars.

C. Correct misplaced reinforcing only as directed in writing by the Architect/Engineer. Bear all costs of redesign, new, or additional reinforcing required because of misplaced bars at Contractor’s expense.

3.7 FIELD QUALITY CONTROL

A. The Testing Agency as specified in the Article QUALITY ASSURANCE, will inspect the work for conformance to contract documents before concrete placement.

1. Inspection: Provide inspection and verification of installed reinforcement. Confirm that the surface of the rebar is free of form release oil or other coatings.

2. Inspect all preheat and welding activities for steel reinforcement when these occur.

3. Exception: Shallow foundations & non-structural slabs-on-grade supporting buildings of no greater than three stories and either of concrete design strength 2500psi (or greater) or supporting light-frame construction do not require special inspection. Non-structural patios, driveways, and sidewalks do not require special inspection.

3.8 CLEANING

A. Remove excess material and debris associated with this work from the job site.

END OF SECTION
PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: Provide all labor, materials, equipment and services to complete all concrete work required, including, but not limited to, the following:

1. Foundations and slabs-on-grade.
2. Installation of all bolts, inserts, sleeves, connections, etc. in the concrete.
3. Joint devices associated with concrete work.
4. Miscellaneous concrete elements, including, but not limited to: equipment pads, light pole bases, flagpole bases, thrust blocks, and manholes.
5. Concrete curing.
6. Coordination with other sections:
   a. Make all preparations and do all work necessary to receive or adjoin other work. Install all bolts and anchors, including those furnished by other sections, into formwork and provide all required blocking.
   b. Install all accessories embedded in the concrete and provide all holes, blockouts and similar provisions necessary for the work of other sections. Provide all patching or cutting made necessary by failure or delay in complying with this requirement at the Contractor’s expense.
   c. Coordinate with other sections for the accurate location of embedded accessories.

B. Related Sections:

1. Pertinent Sections of Division 01 specifying Quality Control and Testing Laboratory services.
2. Pertinent Sections of Division 03 specifying concrete construction.
3. Pertinent Sections of other Divisions specifying work to be embedded in concrete or work penetrating concrete.
4. Pertinent sections of other Divisions specifying floor finishes and sealants applied to concrete substrates.

1.2 REFERENCES

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC) Chapter 19 Concrete.

B. American Concrete Institute (ACI) 211.1 “Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete”; ACI 211.2 “Standard Practice for Selecting Proportions for Lightweight Concrete”.

C. ACI 301 “Specifications for Structural Concrete”.

D. ACI 302.1R “Guide for Concrete Floor and Slab Construction”.

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E. ACI 304R “Guide for Measuring, Mixing, Transporting, and Placing Concrete”.
F. ACI 305R “Hot Weather Concreting”.
G. ACI 306R “Cold Weather Concreting”.
H. ACI 308 “Standard Practice for Curing Concrete”.
I. ACI 318 “Building Code Requirements for Reinforced Concrete and Commentary”.

1.3 SUBMITTALS

A. Submit in accordance with pertinent sections of Division 01 specifying submittal procedures. The General Contractor shall review and approve shop drawings prior to submittal to the Architect/Engineer. Submittals that do not meet these requirements will be returned for correction without review. Submit for review prior to fabrication.

B. Limitation of Review: Structural Engineer’s review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents.

C. Product Data: Submit manufacturers’ data on manufactured products and other concrete related materials such as bond breakers, cure/sealer, admixtures, etc. Demonstrate compliance with specified characteristics. Provide samples of items upon request.

D. Mix Designs: Submit Mix Designs for each structural concrete type required for work per requirements of articles CONCRETE MIXES and QUALITY ASSURANCE. Resubmit revised designs for review if original designs are adjusted or changed for any reason. Non-Structural mixes need not be submitted for review by Structural Engineer.

E. Shop Drawings: Proposed location of construction and cold joints. Proposed location of all slab construction/dowel joints, control joints, and blockouts.

F. Manufacturer’s Installation Instructions: Indicate installation procedures and interface required with adjacent construction for concrete accessories.

G. Batch Plant Certificates: Include with delivery of each load of concrete. Provide Certificates to the Testing Agency and the Architect/Engineer as separate submittals. Concrete delivered to the site without such certificate shall be rejected and returned to the plant. Each certificate shall include all information specified in Article SOURCE QUALITY CONTROL below.

H. Engineering Analysis: Prepared by a California-licensed Civil or Structural Engineer, justifying construction-imposed loads on slabs, beams, and walls which exceed those allowed by CBC for the specified use.

1. 2000 lbs maximum allowable construction load without analysis.
2. 10,000 lbs maximum allowable construction load with analysis.

I. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.4 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Concrete construction verification and inspection to conform to CBC 1705.3.

C. Common Sourcing: Provide each of the following materials from consistent sources for entire project.

1. Cement.
2. Fly ash.
3. Aggregate.

D. Follow recommendations of ACI 305R when concreting during hot weather. Follow recommendations of ACI 306R when concreting during cold weather.

E. Services by the Independent Testing Agency (includes "Special" Inspections) as specified in this Section and as follows:

1. Perform tests and inspections specified below in articles SOURCE QUALITY CONTROL and FIELD QUALITY CONTROL. Duties and limitations of Independent Testing Agency, test costs and reports to be in conformance with pertinent Sections of Division 01.

F. Contractor shall bear the entire cost of remediation, removal, and/or replacement of concrete determined defective or non-conforming, including Architect/Engineer fees for redesign.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Materials specified by brand name shall be delivered in unbroken packages bearing manufacturer's label and shall be brand specified or an approved equal.

B. Delivery, Handling and Storage of other materials shall conform to the applicable sections of the current editions of the various reference standards listed in this Section.

C. Protect materials from weather or other damage. Sort to prevent inclusion of foreign materials.

D. Specific Requirements:


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2. Aggregates: Prevent excessive segregation, or contamination with other materials or other sizes of aggregates. Use only one supply source for each aggregate stock pile.
3. Admixtures:
   a. Store to prevent contamination, evaporation, or damage.
   b. Protect liquid admixtures from freezing and extreme temperature ranges.
   c. Agitate emulsions prior to use.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather (Freezing or near-freezing temperatures) per ACI 306R:
   1. Heat concrete materials before mixing, as necessary to deposit concrete at a temperature of at least 50°F but not more than 90°F.
   2. Do not place concrete during freezing, near-freezing weather, snow, rain or sleet unless protection from moisture and/or cold is provided.
   3. Protect from freezing and maintain at a temperature of at least 50°F for not less than seven days after placing. Take special precautions to protect transit-mixed concrete.
   4. No salts, chemical protection or admixture are permitted without written approval of Architect/Engineer.
   5. Contractor shall maintain an air temperature log for the first 7 days after placement with entry intervals not to exceed 8 hours.

B. Hot Weather per ACI 305R:
   1. Cool concrete materials before mixing, or add ice in lieu of mix water as necessary to deposit concrete at a temperature below 85°F.
   2. Do not place concrete in hot/windy weather without Architect/Engineer review of procedures.
   3. Provide sunshades and/or wind breakers to protect concrete during finishing and immediate curing operations. Do not place slab concrete at air temperature exceeding 90°F.
   4. Provide modified mix designs, adding retarders to improve initial set times and applying evaporation reducers during hot/windy weather for review by Independent Testing Agency prior to use.

1.7 MOCK-UP

A. Construct and erect mock-up panel for architectural concrete surfaces indicated to receive special treatment or finish, as result of formwork.
   1. Panel Size: Sufficient to illustrate full range of treatment.
   2. Number of Panels: 2.
   3. Locate as indicated on drawings.

B. If requested by Architect / Engineer, cast concrete against mock-up panel. Obtain acceptance of resulting surface finish prior to erecting formwork.

C. Accepted mock-up panel is considered basis of quality for the finished work. Keep mock-up exposed to view for duration of concrete work.
D. Mock-up may remain as part of the Work.

1.8 SCHEDULING AND SEQUENCING

A. Organize the work and employ shop and field crew(s) of sufficient size to minimize inspections by the Testing Agency.

B. Provide schedule and sequence information to Testing Agency in writing upon request. Update information as work progresses.

PART 2 – PRODUCTS

2.1 FORMWORK

A. Comply with requirements of Section 03 1000.

2.2 REINFORCEMENT

A. Comply with requirements of Section 03 2000.

2.3 MATERIALS

A. General Requirements: All materials shall be new and best of their class or kind. All materials found defective, unsuitable, or not as specified, will be condemned and promptly removed from the premises.

B. Cementitious Materials:

1. Portland Cement: ASTM C150, Type II, low alkali conforming to CBC 1903.1.
2. Fly Ash (Pozzolan): ASTM C618, Class F.
3. Ground Granulated Blast Furnace Slag: ASTM C989, Grade 100 or 120.

C. Concrete Aggregates:

1. Coarse and Fine Aggregates: ASTM C33; Stone aggregate and sand. Specific source aggregate and/or sand or shrinkage characteristics as required for class of concrete specified.
3. Source shall remain constant throughout the duration of the job. The exact portions of the fine aggregates and coarse aggregates to be used in the mix shall be determined by the mix design.

D. Water: Potable, clean, from domestic source.

E. Admixtures: All admixtures shall be used in strict accordance with the manufacturer’s recommendations. Admixtures containing calcium chlorides or other accelerators shall not be used without the approval of the Architect/Engineer and the Owner’s Testing Laboratory.

2. High Range Water-Reducing Admixtures: ASTM C494 Type F, "MasterRheoBuild 1000" (formerly "RheoBuild 1000") or "MasterGlenium" (formerly "Glenium") series by Master Builders Solutions or equal.

3. Water Reducing Admixture and Retarder: ASTM C494 Type B or D, "MasterPozzolith" (formerly "Pozzolith") series or "MasterSet DELVO" (formerly "DELVO") series by Master Builders Solutions, "Plastiflow-R" by Nox-crete, or equal.


5. Viscosity Modifiers: ASTM C494 Type S.

F. Slurry: Same proportion of cement to fine aggregates used in the regular concrete mix (i.e. only coarse aggregate omitted); well mixed with water to produce a thick consistency.

G. High Strength Grout: See section 05 1200 or 05 1100 for requirements.

H. Dry Pack: Dry pack (used only for cosmetic concrete repairs) shall consist of:

1. One part cement to 2-1/2 parts fine aggregate (screen out all materials retained on No.4 sieve), mixed with a minimum amount of water, added in small amounts.

2. Mix to consistency such that a ball of the mixture compressed in the hand will retain its shape, showing finger marks, but without showing any surface water.

2.4 ACCESSORIES

A. Bonding Agent: ASTM C881, Type II Grade 2 Class B or C. Do not allow epoxy to set before placing fresh concrete.

1. "MasterEmaco ADH 326" (formerly "Concresis Liquid LPL") by Master Builders Solutions;


B. Chemical Hardener: Fluorosilicate solution designed for densification of cured concrete slabs. "MasterKure HD 300 WB" (formerly "Lapidolith") by Master Builders Solutions, "LIQUI-HARD" W.R. Meadows Co, or equal.

C. Moisture-Retaining Cover: ASTM C171, type 1, one of the following:


2. Polyethylene Film: ASTM D 2103, 4 mil thick, clear or white color.

3. White-burlap-polyethylene sheet, weighing not less than 10 oz/per linear yd.

D. Liquid Curing Compound: ASTM C 309, Type 1, Class B, clear or translucent, 25% minimum solids, water base acrylic cure/sealer which will not discolor concrete and compatible with bonding of finishes specified in related sections. W.R. Meadows Co. "Vocomp 25" or equal. Maximum VOC content shall comply with local requirements and California Green Building Code.
E. Under Slab Water Vapor Retarder: Vapor retarder sheet to be ASTM E1745 Class A; 15 mil, single ply extruded polyolefin; permeance no greater than 0.01 U.S. Perms per ASTM E154, ASTM E96 procedure B or ASTM F1249.

   1. "Stego Wrap Vapor Barrier (15mil)" by Stego Industries LLC.
   2. "Vaporguard" by Reef Industries.
   3. Approved Equal.

F. Evaporation Reducer: "MasterKure ER 50" (formerly Confilm), by Master Builders Solutions.

G. Permeability Reducer: Use only where specifically referred to.

   1. Admixture Type: Xypex Chemical Corporation "XYPEx Admix C-500". Dosage: 2-3% of cement content by weight; 15 lb/cu. yd. max. or Master Builders Solutions "MasterLife 300D" (formerly "Rheomac 300D"). Dosage: 2% of cement by mass.
   2. Surface-Applied Type: Xypex Chemical Corporation "XYPEx Concentrate. Brush application: 1.25-1.50lb/sq. yd., 5 parts powder to 2 parts water. Master Builders Solutions "MasterSeal 500" (formerly Tegraproof"). Slurry coat: one part water to 2.25-2.5 parts powder by volume.
   3. Approved equal.

2.5 JOINT DEVICES AND MATERIALS


B. Expansion Joint Filler: ASTM D1751, Nonextruding, resilient asphalt impregnated fiberboard or felt, 3/8 inch thick and 4 inches deep; tongue and groove profile.


C. Joint Filler: ASTM D944, Compressible asphalt mastic with felt facers, 1/4 inch thick and 4 inches deep.

D. Sealant and Primer: As specified in Section 07 9000.

E. Slab Joint Sealant: Compatible with floor finishes specified in related sections.

2.6 CONCRETE MIXES

A. General requirements for mix design and submittal of structural class concrete:

   1. Provide Contractor submittals to Architect/Engineer not less than 15 days before placing concrete.
2. Contractor shall review mix designs and proposed placing requirements prior to submittal for compatibility to ensure that the concrete as designed can be placed in accordance with the drawings and specifications.

3. Changes or revisions require re-submittal: All variations to approved mix designs, including changing type and/or quantity of admixtures shall be resubmitted to the Architect/Engineer for review prior to use.

4. Mix design(s) for all structural classes of concrete to be prepared by qualified person experienced in mix design. Allow for time necessary to do trial batch testing when required.

5. Preparer to provide backup data and certify in writing that mix design meets:
   a. Requirements of the specifications for concrete durability and quality;
   b. Requirements of the California Building Code and ACI 318 Section 26.4, including break histories, trial batching test results, and/or a mix designed by a California Registered Civil Engineer per ACI 318 Section 26.4.3.1(b) and bearing the Engineer’s seal & signature.

6. Clearly note on mix designs with specified maximum WCR if design permits addition of water on site, or clearly identify in the mix design that no water is to be added on site.

7. Deviations: Clearly indicate proposed deviations, and provide written explanation explaining how the deviating mix design(s) will provide equivalent or better concrete product(s) than those specified.

8. Include adjustments to reviewed mix designs to account for weather conditions and similar factors.

B. Proportioning - General: The following provisions apply to all mix designs:

1. Proportion concrete mixes to produce concrete of required average strength (as defined by ACI 318 Section 19.2.1). Select slump, aggregate sizes, shrinkage, and consistency that will allow thorough compaction without excessive puddling, spading, or vibration, and without permitting the materials to segregate, or allow free water to collect on the surface.

2. Select aggregate size and type to produce dense, uniform concrete with low to moderate shrinkage, free from rock pockets, honeycomb and other irregularities.

3. Mix designs may include water reducing and retarding admixtures to meet or exceed minimum set times (time required to place and finish) and to minimize Water Cement Ratios (WCR). Minimum and maximum criteria presented in this section are guidelines and do not represent a specific mix design.

4. Cement Content: Minimum cement content indicates minimum sacks of cementitious material. Increasing cement content to increase early strengths or to achieve specified WCR while maintaining water content is discouraged in order to minimize effects of shrinkage.
   a. Substitution of fly ash for Portland cement on an equivalent weight basis up to 25% replacement is permitted, except at high early strength concrete. Replacement in excess of 25% is not permitted unless part of a specified mix design that has been submitted for review.
b. Substitution of slag for Portland cement on an equivalent weight basis up to 45% replacement is permitted, except at high early strength concrete. Replacement in excess of 45% is not permitted unless part of a specified mix design that has been submitted for review.

c. Such substitution requests may be denied by the Engineer.

5. Water Content: Mix designs with a specified maximum Water Cement Ratio (WCR) may be designed with a lower WCR than specified in order to allow addition of water at the site.

6. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301 and this section.

a. For trial mixtures method, employ independent testing agency acceptable to Architect/Engineer for preparing and reporting proposed mix designs.

7. Placement Options: Mix designs may, at the Contractor's option, be designed for either pump or conventional placement with aggregate size, slumps, etc. to be maintained as specified in this section.

C. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations and this section.

D. Proportioning Structural Light Weight Concrete: Comply with ACI 211.2 recommendations and this section. Maximum cured weight of light weight concrete shall be 120 pounds per cubic feet. General Contractor is responsible for coordinating and providing light weight concrete density to meet the required fire assembly rating of the Construction Documents at the concrete depths provided in the structural drawings. General Contractor to notify the Structural Engineer for review if light weight concrete of the required density for the specified fire assembly rating cannot be sourced.

E. Special mix design requirements for interior concrete floor slabs on grade:

1. Proportion concrete mixes per this specification, ACI 211.1, and the requirements below:

2. Fly Ash Type F, shall be substituted for cement on a 1 lb. per 1 lb. basis, with a minimum replacement of 25% and a maximum of 35%. Alternatively, Slag Grade 100 or 120, shall be substituted for cement on a 1 lb. per 1 lb. basis, with a minimum replacement of 30% and a maximum of 45%.

3. 200 lbs. of 3/8(-) aggregate shall be added to reduce total sand.

4. Reduce total sand to minimum practical.

5. Admixture dosage shall be per manufacturer’s recommendations. Dosage may be increased for workability as long as set times are not excessive for placement and finishing.

F. Special mix design requirements for high volume fly ash concrete:

1. Proportion concrete mixes per this specification, ACI 211.1, and the requirements below:

2. Fly Ash Type F, shall be substituted for cement on a 1 lb. per 1 lb. basis, with a replacement of 50%.
3. Minimum strength at 28 days to be 2500 psi; minimum strength at 56 days to be 3000 psi.
4. Add 200-300 pounds 3/8" aggregate to replace portion of fine aggregate.
5. Admixture dosage shall be per manufacturer’s recommendations. Dosage may be increased for workability as long as set times are not excessive for placement and finishing.
6. Concrete shall be wet cured per CONCRETE CURING.

G. Mix Design Minimum Requirements:

<table>
<thead>
<tr>
<th>Concrete Class</th>
<th>Coarse Aggregate Size (Inches) &amp; Fine Aggregate</th>
<th>Maximum WCR or Maximum Nominal Slump &amp; Tolerance (Inches)</th>
<th>Minimum 28-Day Design Strength</th>
<th>Minimum Cement Sacks/per yd^4</th>
</tr>
</thead>
<tbody>
<tr>
<td>NON-STRUCTURAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1) Lean Concrete (use only where specified)</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>3.0</td>
</tr>
<tr>
<td>2) Slab on Grade Exterior (Walks &amp; Patios)</td>
<td>1&quot; x #4</td>
<td>WCR = .55</td>
<td>2,500</td>
<td>4.5</td>
</tr>
<tr>
<td>STRUCTURAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3) Interior Slab on Grade</td>
<td>1&quot; x #4</td>
<td>WCR = .45</td>
<td>3,000</td>
<td>6.1</td>
</tr>
<tr>
<td>4) Foundation (including stem walls)</td>
<td>1&quot; x #4</td>
<td>WCR = .53</td>
<td>3,000</td>
<td>5.0</td>
</tr>
</tbody>
</table>

1. The tolerance is the maximum deviation allowable without rejection. The mix design shall be based on the nominal value specified and is without water reducing mixtures. Slump to be measured at the end of the hose.
2. The maximum water cement ratio (WCR) is limited at time of placement as noted. No water is to be added on site such that the specified WCR or maximum slump is exceeded without approval of the testing laboratory and the Architect/Engineer. Workability is to be achieved utilizing an acceptable mid-range to high range water reducing admixture.
3. Gradation of aggregate is per ACI 318 section 26.4.1.2 and ASTM C33.
4. Minimum cement content includes all cementitious materials.
5. See Article 2.6E for additional requirements at interior slabs on grade.

2.7 MIXING CONCRETE

A. Batch final proportions in accordance with approved mix designs. All adjustments to approved proportions, for whatever reason, shall be reviewed by the Architect/Engineer prior to use.

B. Batch and mix concrete in accordance with ASTM C94, at an established plant. Site mixed concrete will be rejected.

C. Provide batch and transit equipment adequate for the work. Operate as necessary to provide concrete complying with specified requirements.

D. Place mixed concrete in forms within 1-1/2 hours from the time of introduction of cement and water into mixer or 300 revolutions of the drum whichever comes...
first. Use of, re-mixing, and/or tempering mixed concrete older than 1 hour will not be permitted.

E. Do not add water at the site to concrete mixes with a maximum specified WCR unless the water content at batch time provides for a WCR less than specified and this provision, including the quantity of water which may be added at the site, is specifically noted on the mix design and certification by the mix preparer. See ASTM C94 for additional requirements.

2.8 SOURCE QUALITY CONTROL

A. Services by independent Testing Agency:

1. Batch Plant Certificates: Obtain the weighmaster’s Batch Plant Certificate at arrival of truck at the site. If no batch plant certificate is provided, recommend to the General Contractor that the truckload of concrete be rejected. So note in daily log, along with the location of the load of concrete in the structure if the load is not rejected.
   a. Laboratory’s inspector shall obtain for each transit mixer Batch Plant Certificates to verify mix design quantities and condition upon delivery to the site.
   b. Certificates to include: Date, time, ingredient quantities, water added at plant and on job, total mixer revolutions at time of placement, and time of departure.
   c. Concrete with specified water cement ratio: Add no water on site unless mix design and batch records each show additional water may be added. See ASTM C94 for additional requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

B. Verify work of other sections is complete and tested as required before proceeding.

3.2 PREPARATION

A. Observation, Inspection and Testing:

1. Architect/Engineer: Notify not less than 2 working days before each concrete placement, for observation and review of reinforcing, forms, and other work prior to placement of concrete.

2. Testing Agency: Notify not less than 24 hours before each placement for inspection and testing.

B. Placement Records: Contractor shall maintain records of time, temperature and date of concrete placement including mix design and location in the structure. Retain records until completion of the contract. Make available for review by Testing Agency and Architect/Engineer.
C. Coordinate placement of joint devices with erection of concrete formwork and placement of form accessories.

D. Verify location, position and inclusion of all embedded and concealed items.

E. Verify installation of vapor retarder under interior slabs on grade, as specified in related section, is complete.

F. Cleaning and Preparation:
   1. Remove loose dirt, mud, standing water, and foreign matter from excavations and cavities.
   2. Close cleanout and inspection ports securely.
   3. Thoroughly clean reinforcement and other embedded items free from loose rust and foreign matter. Maintain reinforcing securely in place. Do not place concrete on hot reinforcing.
   4. Dampen form materials and substrates on which concrete is to be placed at least 1 hour in advance of placing concrete; repeat wetting as necessary to keep surfaces damp. Do not saturate. Do not place concrete on saturated material.
      a. Thoroughly wet wood forms (except coated plywood), bottom and sides of trenches, adjacent concrete or masonry and reinforcement.
      b. Concrete slabs on base rock, dampen rock.
      c. Concrete slabs on vapor retarder, do not wet vapor retarder.
   5. Verify that metal forms are clean and free of rust before applying release agent.
   6. Thoroughly clean metal decking. Do not place concrete on wet deck surface.
   7. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

G. Drill holes in existing concrete at locations where new concrete is doweled to existing work. Insert steel dowels and prepare connections as detailed.

H. Do not overcut at existing concrete work to remain. Contractor is responsible for repair/replacement of overcut concrete to the Owner's satisfaction.

3.3 PIPES AND CONDUITS IN CONCRETE

A. Slabs-on-Grade:
   1. No pipe or conduit exceeding 1 inch outside diameter shall be embedded within the specified slab thickness except as specifically detailed.
   2. Do not stack or abut pipes, maintain 3 inches minimum clearance.

B. Sleeving and Wrapping:
   1. Foundations: Sleeve or wrap all individual pipe penetrations, minimum 1-1/2 inches clear to reinforcing all around.
      a. Sleeves: PVC. Provide 1 inch minimum clear all around O.D. pipe to I.D. sleeve, UNO at ends, fill void space with mastic or plastic bituminous cement.
b. Wrapped Vertical Pipes: Provide 1/8 inch nominal sheet foam with three wraps minimum, UNO.

c. Wrapped Horizontal Pipes: Provide 1/8 inch nominal sheet foam with eight wraps minimum, UNO.

d. Underground Fire Lines 4” and Larger: At sleeves provide 2 inch minimum clear all around O.D. pipe to I.D sleeve. At wrapped pipes, provide 1/8 inch nominal sheet foam with sixteen wraps minimum.

2. Slabs or Curbs: Wrap pipes as described above.

C. Space groups of pipes/conduits at least 3 sleeve diameters apart, do not interrupt specified concrete and reinforcement.

1. Provide block-outs as detailed when grouping of pipes/conduits in foundation or other structural member prevents spacing as described. Notify Architect/Engineer for review of any conditions not conforming to details.

2. Center pipe/conduit penetrations in the depth and/or thickness of foundations.

3. Maximum size of pipe/conduit penetrations shall not exceed the least dimension of concrete divided by 3.

3.4 CONCRETE PLACEMENT

A. Transporting:

1. Provide clean, well-maintained equipment of sufficient quantity and capacity to execute the work and produce concrete of quality specified.

2. Handle and transport concrete from mixer to final deposit location as rapidly as practicable. Prevent separation or loss of ingredients.

B. Perform concrete placement by methods which will not puncture, damage or disturb vapor retarder membrane. Repair all damage to vapor retarder membrane before covering.

C. Placement - General: Placement, once started, shall be carried on as a continuous operation until section of approved size and shape is completed. Provide construction joints as detailed on the drawings. Engineer’s written approval required for all deviations.

1. Deposition:

a. Deposit concrete to maintain an approximately horizontal plastic surface until the completion of the unit placement.

b. Deposit as neatly as practicable in final position, minimize re-handling or flow.

c. Do not drop concrete freely where reinforcing bars, embeds, or obstructions occur that may cause segregation. Provide spouts, elephant trunks, or other means to prevent segregation during placement.

2. Depth: Layered placement in columns and walls shall not exceed ten feet vertical depth.

a. Place concrete in minimum 32 inch horizontal lifts.
b. Schedule placement to ensure that concrete will not take initial set before placement of next lift.

c. No horizontal cold joints are allowed in columns or walls.

3. Progress Cleaning: Remove all concrete spilled on forms or reinforcing steel in portions of structure not immediately concreted. Remove completely before concrete sets.

4. Interruptions: Shut down placement operations and dispose of all remaining mixed concrete and concrete in hoppers or mixers following all interruption in placement longer than 60 minutes.
   a. If such interruption occurs, provide new or relocate existing construction joints as directed by Engineer.
   b. Cut concrete back to the designated line, cleaning forms and reinforcing as herein specified.
   c. Prepare for resumption of placement as for new unit when reason for interruption is resolved.

D. Consolidation:

1. Consolidate all concrete thoroughly during placement with high-speed mechanical vibrators and other suitable tools. Perform manual spading and tamping to work around reinforcement, embedded fixtures, and into corners of formwork as required to obtain thorough compaction.
   a. Provide vibrators with sufficient amplitude for adequate consolidation.
   b. Use mechanical vibrators at each point of concrete placement.
   c. Keep additional spare vibrators, in addition to those required for use, at the site for standby service in case of equipment failure.

2. Consolidate each layer of concrete as placed.
   a. Insert vibrators vertically at points 18 to 30 inches apart; work into top area of previously placed layer to reconsolidate, slowly withdraw vibrator to surface.
   b. Avoid contact of vibrator heads with formwork surfaces.
   c. Systematically double back and reconsolidate wherever possible. Consolidate as required to provide concrete of maximum density with minimized honeycomb.

E. Unacceptable Materials:

1. Do not place concrete that has started to set or stiffen. Dispose of these materials.
2. Do not add water on site to concrete except as specified in the approved mix design, see PART 2 above.

F. Protection of installed work:

1. Do not introduce any foreign material into any specified drainage, piping or duct systems.
2. Contractor shall bear all costs of work required to repair or clean affected work as a result of failure to comply with this requirement.

3.5 CONCRETE JOINTS

A. Structural Joints (Construction/Cold Joints):
1. Locate joints only where shown, or as approved.
2. **Review Required:** Joints not indicated on the plans shall be located to meet the minimum requirements below, shall not impair the strength of the structure and shall be submitted to Architect/Engineer for review prior to placement of concrete.
   a. Indicate proposed location(s) of construction/cold/expansion joints on shop drawing submittals for review prior to placing concrete.
3. Clean and roughen all surfaces of previously placed concrete at construction joints by washing and sandblasting to expose aggregate to 1/4 inch amplitude.
4. Slabs-On-Grade: Maximum Length of continuous placement shall not exceed 60 feet without special review by the Architect/Engineer. Alternate or stagger placement sections.
5. Foundations: Maximum Length of continuous placement shall not exceed 200 foot increments. Provide “keyed” shut-off locations made up with form boards. Extend reinforcing one lap length or more through shut-off.
   a. All reinforcement shall be continuous through construction/cold joint, lapping to adjacent reinforcing in future placement.

**B. Expansion/Construction Joints (Dowel Joints and Control Joints):**

1. Interior and Exterior Slabs-on-Grade:
   a. Expansion/Construction Joints: Provide dowel joints or control joints at a maximum dimension (in feet) of three times the slab thickness (in inches) in each direction unless noted otherwise (15'-0" maximum). Install joints to match slab level and in straight lines. Locate joints at all reentrant corners including blockouts.
   b. Proportions: Install joints to divide slab into rectangular areas with long dimensions less than 1.5 times short dimension.
2. Exterior Concrete Slabs-on-Grade (walkways, patios):
   a. Expansion/ construction joints: Provide a 2 inch deep troweled groove or asphalt impregnated joint material embedded 50 percent of the slab depth at 12 feet on center, maximum.
   b. Proportions: Place no section with a length larger than two times width. Additionally, place joints at all inside corners and at all intersections with other work.

**C. Joint Types:**

1. Dowel Joint: A keyed joint with smooth dowels passing through to allow unrestricted movement due to contraction and expansion. Joints are as specified on the drawings.
2. Control Joint(s): Shrinkage crack control joints may be of the following types when shown on the drawings. Install joints in a straight line between end points with edges finished appropriate to type. Depth shall be 25% of the slab thickness, unless noted otherwise. Fill joints with sealant as shown on the drawings or as required by related sections.
   a. 1/4 inch wide troweled joint.
   b. Keyed joint: Only at locations where concealed by other finishes.
   c. Masonite Strip, 1/8 inch: Only at locations where concealed by other finishes.
d. Saw Cut, 1/8 inch: Must be performed within eight hours of completion of finishing. Do not make saw cuts if aggregate separates from cement paste during cutting operation. Prevent marring of surface finish. Fill with flexible sealant.

3.6 VAPOR RETARDER

A. Vapor Retarder Installation: Install as specified in PART 2, ASTM E1643, and per manufacturer’s recommendations including taping and lapping of seams, sealing of penetrations, and repair of damage. Do not extend vapor retarder below footings.

3.7 FLATWORK

A. General Requirements for All Concrete Formed & Finished Flat:

1. Edge Forms and Screeds: Set accurately to produce indicated design elevations and contours in the finished surface, edge forms sufficiently strong to support screed type proposed.
2. Jointing: Located and detailed as indicated.
3. Consolidation: Concrete in slabs shall be thoroughly consolidated.

B. Flatwork Schedule:

1. Exterior Slabs-On-Grade: Place concrete directly over sub-base as indicated.
   a. Sub-Base: Clean free-draining, crushed base rock, 4 inch minimum thickness, thoroughly compacted.
2. Interior Concrete Slabs-On-Grade:
   a. Sub-Base: Clean free-draining, crushed base rock, 4 inch minimum thickness, thoroughly compacted.
   b. Vapor Retarder: Install over sub-base.

3.8 FORMED SURFACES

A. Form all concrete members level and plumb, except as specifically indicated. Comply with tolerances specified in ACI 318 Section 26.11, ACI 301 Section 2, and this specification, except that maximum permissible deviation is 1/4 inch end-to-end for any single member.

B. Cambers: Provide all cambers indicated in the formwork construction. Set screeds to produce specified cambers in the finished concrete.

3.9 CONCRETE FINISHES

A. Flatwork Finishing:

1. Perform with experienced operators.
2. Finish surfaces monolithically. Establish uniform slopes or level grades as indicated. Maintain full design thickness.
3. In areas with floor drains, maintain design floor elevation at walls; slope surfaces uniformly to drains as indicated on drawings.
4. Flatwork Finish Types:
a. Wood Float Finish: Surfaces to receive quarry tile, ceramic tile, or cementitious terrazzo with full bed setting system, or wood frame for raised finished floors.

b. Steel Trowel Finish: Surfaces to receive carpeting, resilient flooring, seamless flooring, thin set terrazzo, thin set tile or similar finishes specified in related sections. Trowel twice, minimum.

c. Broom Texture Finish: Exterior surfaces as indicated or for which no other finish is indicated. Finish as for steel trowel finish, except immediately following first troweling, (depending on conditions of concrete and nature of finish required) provide uniform surfaces texture using a medium or coarse fiber broom.

B. Other Concrete: Provide as required to achieve appearance indicated on structural and architectural drawings and related sections.

1. Repair surface defects, including tie holes, immediately after removing formwork.

2. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

3. Exposed Form Finish: Finish concrete to match forms. Rub down or chip off and smooth fins or other raised areas 1/4 inch or more in height. Provide finish as follows:
   a. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.
   b. Grout Cleaned Finish: Wet areas to be cleaned and apply grout mixture by brush or spray; scrub immediately to remove excess grout. After drying, rub vigorously with clean burlap, and keep moist for 36 hours.
   c. Cork Floated Finish: Immediately after form removal, apply grout with trowel or firm rubber float; compress grout with low-speed grinder, and apply final texture with cork float.

4. Intermediate joint and score marks and edges: Tool smooth and flush unless otherwise indicated or as directed by the Architect.

5. Use steel tools of standard patterns and as required to achieve details shown or specified. All exposed corners not specified to be chamfered shall have radiused edges.

3.10 TOLERANCES

A. Minimum Flatwork Tolerances: Measure flatness of slabs with in 48 hours after slab installation in accordance with ACI 302.1R and ASTM E1155 and to achieve the following FF and FL tolerances:

1. Exterior surfaces: 1/8 inch minimum per foot where sloped to drain. Level otherwise. FF20 and FL15.

2. Interior surfaces not otherwise shown or required: Level throughout. FF25 and FL20

3. Interior surfaces required to be sloped for drainage: 1/8 inch in 10 ft.

4. Finish concrete to achieve the following tolerances:
   c. Flooring manufacturer and pertinent section of Division 9.
B. Formed Surface Tolerances:

1. Permanently Exposed Joints and Surfaces: Provide maximum differential height within two feet of, and across construction joints of 1/16 inch.
2. Vertical Elevations: Elevation of surfaces shall be as shown or approved.

3.11 SEPARATE FLOOR TOPPINGS

A. Prior to placing floor topping, roughen substrate concrete surface and remove deleterious material. Broom and vacuum clean.

B. Place required dividers, edge strips, reinforcing, and other items to be cast in.

C. Apply bonding agent to substrate in accordance with manufacturer's instructions.

D. Apply sand and cement slurry coat on base course, immediately prior to placing toppings.

E. Place concrete floor toppings to required lines and levels. Place topping in checkerboard panels not to exceed 20 feet in either direction.

F. Screed toppings level, maintaining surface tolerances per above.

3.12 CONCRETE CURING

A. Curing - General: Cure in accordance with ACI 308. Maintain concrete water content for proper hydration and minimize temperature variations. Begin curing immediately following finishing.

B. Protection During Curing: Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury. The General Contractor is responsible for the protection of the finished slab from damage.

1. Avoid foot traffic on concrete for minimum of 24-hours after placement.
2. Protect concrete from sun and rain.
3. Maintain concrete temperature at or above 50 degrees F. during the first 7 days after placement. See Article ENVIRONMENTAL REQUIREMENTS.
4. Do not subject concrete to design loads until concrete is completely cured, and until concrete has attained its full specified 28-day compressive strength or until 21 days after placement, whichever is longer.
5. Protect concrete during and after curing from damage during subsequent building construction operations. See Article PROTECTION.

C. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

1. Normal concrete: Not less than 7 days.
2. High early strength concrete: Not less than 4 days.
D. Begin curing immediately following finishing.

E. Surfaces Not in Contact with Forms:
   1. Start initial curing as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than 3 days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
   2. Begin final curing after initial curing but before surface is dry.
      a. Moisture-retaining cover: Seal in place with waterproof tape or adhesive.
      b. Curing compound: Apply in two coats at right angles, using application rate recommended by manufacturer.
   3. In addition, see specific conditions noted below.

F. Slabs on Grade: Cure by one of the following methods:
   1. Water Cure (Ponding): Maintain 100 percent coverage of water over floor slab areas, continuously for minimum 7 calendar days.
   2. Spraying: Spray water over floor slab areas and maintain wet for 7 days.
   3. Moisture-Retaining Film or Paper: Lap strips not less than 6 inches and seal with waterproof tape or adhesive; extend beyond slab or paving perimeters minimum 6 inches and secure at edges; maintain in place for minimum 7 days.
   4. Absorptive Moisture-Retaining Covering: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides and extend beyond slab or paving perimeters 6 inches minimum; maintain in place for minimum 7 days.
   5. Liquid Membrane-forming Curing Compound: Provide only when subsequent concrete treatments or finish flooring specified in related sections will not be affected by cure/sealer. Apply curing compound in accordance with manufacturer's instructions at the maximum recommended application rate in two coats, with second coat applied at right angles to first.

G. Formed Concrete Members: Cure by moist curing with forms in place for full curing period.
   1. Protect free-standing elements from temperature extremes.
   2. Maintain forms tight for minimum 7 days. Maintain exposed surfaces continuously damp and completely covered by sheet materials thereafter.
   3. Maintain all shoring in place. Refer to related sections specifying formwork.
   4. Membrane Curing Compound: Apply compound in accordance with manufacturer's instructions in one coat.

H. Foundations: Apply curing compound immediately after floating.

3.13 CONCRETE HARDENER

A. Apply hardener to all floor slabs not receiving other finishes after 30 days minimum curing. Clean slabs of non-compatible cure/sealers or other foreign material(s) and apply in strict accordance with the manufacturer's directions.
3.14 GROUTING AND DRY PACK

A. Set steel plates on concrete or masonry with high strength grout bed, completely fill all voids; thoroughly compact in place. See Section 05 1200 or 05 1100.

B. Bolts or inserts dry packed or grouted in place shall cure for minimum 7 days before tensioning.

3.15 FIELD QUALITY CONTROL

A. Testing and Inspections by Independent Testing Agency: Provided verification and inspection of concrete per CBC Table 1705.3. Provide written reports for to Engineer, Architect, Contractor and Building Official for the following tests and inspections:

B. Testing & Inspection: Provide periodic inspection of reinforcing steel. Provide continuous inspection during placement of structural class concrete, 3000 psi or more. Non-structural class concrete with a design strength of 2500 psi or less to have periodic inspection on a 150 cubic yard basis as required to assure conformance.

1. Provide periodic inspection of bolts in concrete prior to and during placement where so noted on the construction documents.

   a. Take four standard 6 inch x 12 inch (or five 4 inch x 8 inch) cylinder specimens on the site, of each class of concrete as specified in PART 2, not less than once a day or for each 150 cubic yards or 5000 sq ft or fraction thereof placed each day.
   b. Record the location of each concrete batch in the building in a log and also note on each specimen.
   c. Perform standard compression test of cylinders in accordance with ASTM C39, one at 7 days and two (three for 4x8 cylinders) at 28 days.
   d. Hold fourth (fifth) cylinder untested until specified concrete strengths are attained.

3. Structural Concrete Slump Test and Air Tests: Perform in accordance with ASTM D143 and C231 or C173 at the time of taking test cylinders, and/or at one-hour intervals during concrete placing.

4. Measure and record concrete temperature upon arrival of transit mixers and when taking specimens. Note weather conditions and temperature.

5. Propose adjustments to reviewed mix designs for Architect / Engineer review to account for variations in site or weather conditions, or other factors as appropriate.

6. Water Vapor Transmission Tests: Floors receiving floor finishes specified in related sections will be tested prior to installation of flooring systems. Refer to sections specifying floor finishes for related requirements.

C. Services by Contractor:

1. Rejection of Concrete Materials: Do not use the following without prior written approval of the Architect/Engineer;
   a. Materials without batch plant certificates.
b. Materials not conforming to the requirements of these specifications.

3.16 ADJUSTING

A. Inspect all concrete surfaces immediately upon formwork removal. Notify Architect/Engineer of identified minor defects. Repair all minor defects as directed.

B. Surface and Finish Defects: Repair as directed by the Architect/Engineer, at no added expense to the Owner. Repairs include all necessary materials; reinforcement grouts, dry pack, admixtures, epoxy and aggregates to perform required repair.
   1. Repair minor defective surface defects by use of drypack and surface grinding. Specific written approval of Architect/Engineer is required. Submit proposed patching mixture and methods for approval prior to commencing work.
   2. Slabs-on-Grade, Elevated Slabs and on Slabs on Metal Deck: Review for "curled" slab edges and shrinkage cracks prior to installation of other floor finishes. Grind curled edges flush, fill cracks of 1/16 inch and greater with cementitious grout.
   3. Grind high spots, fins or protrusions caused by formwork; Fill-in pour joints, voids, rock pockets, tie holes and other void not impairing structural strength. Provide surfaces flush with surrounding concrete.

3.17 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required compressive strength, lines, details, dimensions, tolerances, finishes or specified requirements; as determined by the Architect/Engineer.

B. Repair or replacement of defective concrete will be determined by the Architect/Engineer who may order additional testing and inspection at his option. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

C. Specific Defects:
   1. "Low-Strength"; Concrete Not Meeting Specified Compressive Strength after 28 days:
      a. Concrete with less than 25% Fly Ash or 35% Slag as cementitious material: Test remaining cylinder(s) at 56 days. If strength requirements are met, concrete strength is acceptable.
      b. Concrete with 25% or more Fly Ash or 35% or more Slag as cementitious material: Test remaining cylinder(s) at 70 days. If strength requirements are met, concrete strength is acceptable.
   2. Excessive Shrinkage, Cracking, Crazing or Curling; Defective Finish: Remove and replace if repair to acceptable condition is not feasible.
   3. Lines, Details, Dimensions, Tolerances: Remove and replace if repair to acceptable condition is not feasible.
4. Slab sections not meeting specified tolerances for trueness/flatness or lines/levels: Remove and replace unless otherwise directed by the Architect/Engineer. Minimum area for removal: Fifteen square feet area unless directed otherwise by the Architect/Engineer.

5. Defective work affecting the strength of the structure or the appearance: Complete removal and replacement of defective concrete, as directed by the Architect/Engineer.

3.18 CLEANING

A. Maintain site free of debris and rubbish. Remove all materials and apparatus from the premises and streets at completion of work. Remove all drippings; leave the entire work clean and free of debris.

B. Slabs to Receive Floor Finishes Specified in other sections: Remove non-compatible cure/sealers or other foreign material(s) which may affect bonding of subsequent finishes. Leave in condition to receive work of related sections.

3.19 PROTECTION

A. Protect completed work from damage until project is complete and accepted by Owner.

B. Construction Loads: Submit engineering analysis for equipment loads (including all carried loads) specified in article submittals.

C. Keep finished areas free from all equipment traffic for a minimum of 4 additional days following attainment of design strength and completion of curing.

D. Protection of Drainage Systems:

1. Care shall be taken not to introduce any foreign material into any specified drainage, piping or duct system.

2. Cost of work to repair or clean drainage system as a result of failure to comply with this requirement will be back charged to the contractor.

E. Cover traffic areas with plywood sheets or other protective devices; maintain protection in place and in good repair for as long as necessary to protect against damage by subsequent construction operations.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide concrete flooring sealing system at apparatus bay for heavy duty applications.
   1. Sealing system not required at toilet room.

B. Related Sections:
   1. Section 03 90 00: Concrete floor repair.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Meeting: Convene not less than one week prior to commencing pouring of concrete slabs at areas indicated to have a sealed concrete floor finish.
   1. Require attendance of those directly affecting work of this Section including those related to concrete materials, concrete forming and preparation, concrete pouring and finishing, and sealed concrete flooring.
   2. Review concrete installation and finishing procedures and coordination required with related work and polishing requirements.

1.3 SUBMITTALS

A. Product Data: Furnish manufacturer's literature for each type of material involved in sealing concrete.

B. Samples: Furnish sample panels of sealed concrete.

C. Maintenance Instructions: Provide written instructions for recommended periodic maintenance.

1.4 QUALITY ASSURANCE

A. Sealed Concrete Floor Installers: Firms with not less than five years successful experience sealing concrete using one of specified systems and acceptable to system manufacturer.

B. Mock-Up: Erect minimum 100 square feet of sealed concrete flooring at location as approved. Approved mock-up may be incorporated into Project.
PART 2 - PRODUCTS

2.1 SYSTEM MANUFACTURERS
   A. W.R. Meadows, Inc. (800.342.5976).
   B. PROSOCO, Inc. (800.255.4255).
   C. L.M. Scofield Co. (800.800.9900).
   D. Advanced Floor Products (888.942.3144).
   E. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS
   A. System Description: Provide sealed concrete flooring including preparation of concrete substrate and sealing.
   C. Regulatory Requirements, Slip-Resistance: Hard surface finishes to comply with requirements of authorities having jurisdiction for slip-resistant hard surfaces, including general code requirements and for access for persons with disabilities.
   D. Concrete Floor Sealing System: Provide system specified providing sealed concrete floor suitable for heavy duty applications.
   E. Crack Repair and Filler: Repair cracks including hairline cracks as small as 1/64” with product recommended by concrete sealing materials manufacturer but not less than Metzger McGuire/Rapid Refloor.

PART 3 - EXECUTION

3.1 EXAMINATION
   A. Ensure surfaces to receive sealer are clean and well cured.
   B. Do not commence work until surface conditions are within tolerances required for proper finishing based on manufacturer recommendations.
   C. Start of work indicates acceptance of conditions.

3.2 PREPARATION
   A. Clean concrete slab free from foreign matter and prepare concrete for sealing in accordance with system manufacturer recommendations.
B. Patch and repair concrete as required to eliminate cracks, spalling, and defects detrimental to sealed concrete floor.

3.3 INSTALLATION
   A. Comply with sealer manufacturer recommendations and application instructions for application of concrete sealer as required to match approved samples and mock-up.

3.4 PROTECTION
   A. Comply with system manufacturer recommendations for protecting sealed floors until ready for use. Keep surface dry for minimum 48 hours after application.
   B. Do not permit traffic on sealed concrete floors for at least 72-hours.
   C. Protect sealed floor until Substantial Completion.
   D. Repair or replace sealed flooring damaged prior to Substantial Completion.

END OF SECTION
PART 1 – GENERAL

1.1 SUMMARY

A. Section Includes: All labor, materials, equipment and operations required to complete structural and miscellaneous metals in shapes and configurations indicated; including:

1. Structural steel columns, beams, base plates, and bolts.
2. Miscellaneous structural steel and connections installed by related sections.
3. Anchor bolts and steel inserts embedded in concrete, installed by related sections.
4. Fabricated steel items embedded in concrete installed by related sections.
5. Supervision of anchor bolt setting, leveling and elevations to insure required fit of steel work.
6. Shop priming and field touch-up, galvanizing.
7. Bracing, Shoring, Fabrication and Erection.

B. Related Sections:

1. Pertinent sections of Division 01 specifying Quality Control and Testing Agency services.
2. Pertinent Sections of other Divisions specifying concrete reinforcement, formwork, concrete, structural and miscellaneous metal fabrications, steel joists, metal decking, cold-formed metal framing, rough carpentry.

1.2 REFERENCES

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC): Chapter 22 Steel.

B. American Institute of Steel Construction (AISC) 303 “Code of Standard Practice for Steel Buildings and Bridges”.

C. AISC 360 “Specification for Structural Steel Buildings”.

D. American Welding Society (AWS) D1.1 “Structural Welding Code - Steel”.

E. Underwriters Laboratories (UL) FRD “Fire Resistance Directory”.

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1.3  SUBMITTALS

A. Submit in accordance with pertinent sections of Division 01 specifying submittal procedures. The General Contractor shall review and approve shop drawings prior to submittal to the Architect/Engineer. Submittals that do not meet these requirements will be returned for correction without review.

B. Limitation of Review: Structural Engineer’s review will be for general conformance with design intent as indicated in the Contract Documents and does not relieve Contractor of full responsibility for conformance with the Contract Documents.

C. Product Data: Submit manufacturer’s product data, specifications, location and installation instructions for proprietary materials and reinforcement accessories. Provide samples of these items upon request.

D. Shop drawings: Include all of the following:
   1. Profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
   2. Fabrication tolerances for all steel.
   3. Connections: All, including type and location of shop and field connections.
   4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths, type, size, and sequence. Designate demand critical welds.
   5. Cross-reference all shop drawing detail references to contract document detail references.
   6. Secure all field measurements as necessary to complete this work prior to submitting shop drawings for review.
   7. Provide holes, welded studs, etc. as necessary to secure work of other sections.
   8. Provide the following as separate submittals for each building or unit of work:
      a. Bolt and anchor setting plans.
      b. Layout, fabrication and erection drawings.

E. Certifications:
   1. Steel Materials: Submit the following for identified materials.
      a. Manufacturer’s Mill Certificate: Certify that products meet or exceed specified requirements.
      b. Mill Test Reports: Indicate structural strength, destructive test analysis, and non-destructive test analysis.
      c. Contractor’s affidavit certifying that all identified steel materials provided are of the grades specified and match the certificates supplied.
2. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification per AWS D1.1.

F. Samples: Provide samples to the Testing Agency as specified in Article SOURCE QUALITY CONTROL, at no additional costs.

1.4 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies, refer to pertinent sections of Division 01 and CBC Chapter 17.

B. All tests shall be performed by a recognized testing agency as specified in pertinent sections of Division 01.

C. Certification and Identification of Materials and Uses: Provide Testing Agency with access to fabrication plant to facilitate inspection of steel. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection and all material identification/test information listed below.

1. Test all steel as required by ASTM A6.
2. Provide manufacturer's Mill Test Reports for all materials. Include chemical and physical properties of the material for each heat number manufactured. Tag all fabricated materials with heat number.
3. Provide letter certifying all materials supplied are from heat numbers covered by supplied mill certificates. Include in letter the physical location of each material type and/or heat number in the project (i.e. walls, braced frames etc.).
5. Provide all certification, verifications, and other test data required to substantiate specified material properties at no additional cost to the Owner.

D. Testing and Inspection: Tests and Inspections performed by Independent Testing Agency are specified below in Articles SOURCE QUALITY CONTROL and FIELD QUALITY CONTROL. Duties and limitations of Independent Testing Agency, test costs and test reports in conformance with pertinent sections of Division 01.

E. The following standards are the minimum level of quality required. Provide higher quality work as specifically indicated in the Contract Documents.

1. Workmanship and details of structural steel work shall conform to the CBC and AISC 360.
2. The quality of materials and the fabrication of all welded connections shall conform to AWS D1.1.
3. Comply with Section 10 of AISC 303 for architecturally exposed structural steel.

F. The Testing Agency will review all submittals and testing of materials.

G. All re-inspections made necessary by non-conforming work shall be at the Contractor’s expense.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to project site in bundles marked with durable tags indicating heat number, mill, member size and length, proposed location in the structure and other information corresponding with markings shown on placement diagrams.

B. Handle and store materials above ground to prevent damage, contamination or accumulation of dirt or rust.

1.6 SCHEDULING AND SEQUENCING

A. Organize the work and employ shop and field crew(s) of sufficient size to minimize inspections by the Testing Agency.

B. Provide schedule and sequence information to Testing Agency in writing upon request. Update information as work progresses.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural Steel Plates: ASTM A36 or ASTM A572 Gr. 50 or ASTM A529 Gr. 50

B. HSS (Hollow Structural Sections):

1. Rectangular or Square: ASTM A500, Gr. C.

C. Bolts, Nuts, and Washers: ASTM A307 Grade A machine bolts with ASTM A563 Grade A nuts and ASTM F844 washers to match. See FINISHES section for galvanization, where required.

D. Anchor Bolts/Rods, Nuts, and Washers: ASTM F1554 Gr. 36 or 55 with ASTM A563 Grade A nuts and ASTM F436 Type 1 washers. Grade DH nuts where Grade 105 rod is specified. No upset thread allowed.

E. Arc-Welding Electrodes: AWS Standards E70 or equivalent, except no E70T-4 allowed.

F. Other Welding Materials: AWS D1.1; type required for materials being welded.
G. Deformed Bar Anchors: ASTM A496.

2.2 ACCESSORIES

A. High Strength Grout: ASTM C1107, non-shrink, premixed compound consisting of aggregate, cement, and water reducing plasticizing agents. Minimum compressive strength f'c = 7000 psi at 28 days. Non-metallic where exposed to view. BASF “MasterFlow 928” or equivalent.

2.3 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Fabricate connections for bolt, nut, and washer connectors.

C. Protect all materials, before and after fabrication, from rust, corrosion, dirt, grease, and other foreign matter.

D. Fabricate framing members free from twists or bends. Form holes, cut and sheared edges neatly without kinks, burrs, or warped edges.

E. Exposed Steel: Straight, smooth, free of nicks, scars or dents.

F. Gas Cutting: Gas cutting of holes in a member shall not be permitted.

G. Splicing of members: Members requiring splicing due to length requirements may be spliced using full penetration butt welds when such welds and procedures are inspected and certified by the Testing Agency, in conformance with AWS and AISC standards. The location of splices shall be approved by the Architect/Engineer in writing prior to fabrication.

H. Welding: Welding of structural steel connections shall be performed by qualified welders in accordance with AWS Standards. All weld sizes shall match those shown on the drawings.

1. Preparation: Clean all surfaces free of rust, paint and all foreign matter. Remove paint or scale by brushing, chipping or hammering as required. Chip clean and wire brush burned or flame cut edges before welding. Space and alternate welds, clamping as necessary to prevent warp or misalignment.

2. Sequence Welding: When welds enclose, or partially enclose, the perimeter or portion of the surface of a member, make weld bead in sequence, or staggered. Minimize internal stresses. Weld groups of members occurring in a single line in staggered sequence to minimize distortion of the structural frame.

3. Faulty and Defective Welding: Welds failing to meet AWS standards and the Contract Documents shall be rejected and remade at Contractor
expense. All welds showing cracks, slag inclusion, lack of fusion, bad undercut or other defects, ascertained by visual or other means of inspection shall be removed and replaced with conforming work.

4. Minimum Weld Strengths: All welds shall match the minimum weld sizes recommended by AISC. Details of fabrication not specifically shown shall match similar details which are specifically shown. All bevel and groove welds shall be full penetration unless size is noted otherwise.

I. Grinding: Grind smooth the following structural steel and connections;

1. Exposed cut ends of structural and fabricated shapes.
2. All welds exposed to view.
3. Mitered and fit-up corners and intersections.

J. Back-Up Bars: Required for all complete penetration welds.

K. Bolt Holes: Edge, end distances and spacing shall conform to dimensions shown on the drawings, and as follows;

1. Round: Size indicated and 1/16 inch maximum oversize, except 1 inch and larger bolts may have 1/8 inch maximum oversize.
2. Slotted: At locations specifically noted on the drawings, provide size indicated and 1/16 inch by 1/4 inch oversize slotted in direction perpendicular to applied loads.
3. Holes in base plates for anchor bolts may be 1/8 inch oversize.

L. Comply with Section 10 of AISC 303 for architecturally exposed structural steel (AESS). See architectural & structural drawings for locations of AESS.

2.4 FINISHES

A. Steel exposed to inclement atmospheric conditions or weather (such as coastal moisture or seasonal rain) shall be sufficiently primed or otherwise protected against corrosion. If condition of steel is suspect due to weathering/corrosion, Contractor shall bear cost of inspection to determine if excessive corrosion is present and if steel member(s) requires repair or replacement. Contractor shall bear cost of repair or replacement.

B. Prepare and finish structural and miscellaneous steel component surfaces as follows, unless a higher standard-of-care is determined necessary per item A:

1. Unpainted, interior, dry exposure surfaces need not be primed.
2. Finished painted, interior, dry exposure surfaces:
   a. Surface Preparation: SSPC-SP2 Hand-Tool and/or SP3 Power-Tool Cleaning. Apply Primer Type A. Field touchup with same primer.
   b. Where jobsite exposure is expected to exceed 6 months, SSPC-SP6 / NACE No. 3 Commercial Blast-Cleaning is required. Apply
3. Surfaces to be fire proofed need not be primed unless required by the fireproofing manufacturer or if jobsite exposure is expected to be inclement per item A. Where unprimed steel is to receive fireproofing, prepare steel surface as required by fireproofing manufacturer. If fireproofed surfaces are to be primed, provide primer as follows:
   b. Apply Primer Type C. Field touchup with same primer.

4. Exterior exposed (unpainted) surfaces and as otherwise indicated to receive galvanizing:
   a. Galvanize per ASTM A123 Class 55 minimum. Passivation agents are not permitted on galvanized metal that is to be painted. Provide vent holes per ASTM A385 at closed sections (such as HSS). Submit proposed location of vent holes for review by Engineer.
   b. Connection hardware shall be hot-dip galvanized per ASTM A153 or F2329. Mating bolts and nuts shall receive the same zinc-coating process.
   c. Repair all uncoated, damaged, or altered galvanized surfaces per ASTM A780.

C. Do not prime the following surfaces unless otherwise indicated:
   1. Connections to be field welded.
   2. Steel in contact with concrete.
   3. Surfaces to receive welded metal decking.

D. Do not cover up work with finish materials until inspection is complete and work is approved by the Testing Agency.

2.5 SOURCE QUALITY CONTROL

A. An independent Testing Agency will perform source quality control tests and submit reports, as specified in pertinent sections of Division 01.

B. Steel Materials Testing:
   1. No testing is required for materials identified in accordance with CBC 2202.1 (heat number, grade stencil, etc.).
   2. Unidentified steel- General: Test all structural shapes. In addition, test to verify Fy and Fu values when engineering requirements exceed Fy = 25 ksi for design.

C. Shop Welding Inspection:
   1. Testing Agency shall inspect and certify all structural welds unless the fabricating shop has been accredited in conformance with CBC requirements. Submit certification to the Architect/Engineer for review
and the Building Official for approval.

2. Welder Qualifications: Welding inspector shall verify that all the welders are properly qualified prior to steel fabrication and state the qualifications of each welder in the welding inspection report.

3. Welding Inspection: Continuous inspection required unless otherwise noted below. Comply with requirements of AWS D1.1.
   a. Welding Inspector shall check all welds, materials, equipment and procedures.
   b. Welding Inspector shall provide reports certifying the welding is as required and has been done in conformity with the plans, specifications and codes.
   c. Welding Inspector shall use radiographic, ultrasonic, magnetic particle, or any other necessary aid to visual inspection to assure adequacy of welds.

4. Periodic Inspection Acceptable:
   a. Single pass fillet welds not exceeding 5/16 inch.

D. Bolts, Nuts, and Washers: Provide samples to Testing Agency for required testing, at no additional cost.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.2 ERECTION

A. Erect structural steel in compliance with AISC 303.

B. Framing:
   1. Erect all structural steel true and plumb.
   2. Verify proper final alignment prior to making final connections.

C. Field Connections:
   1. Workmanship of field bolted and welded connections shall conform in all respects to methods and tolerances specified for fabrication.
   2. Field weld components indicated on shop drawings. Sequence field welds to minimize built-up stress and distortion of the structural frame. Verify sequence with Engineer. Coordinate field welding schedule with Testing Laboratory.
   3. Welded Studs: Install in accordance with manufacturer's instructions and structural welding code AWS D1.1.

D. Templates: Provide bolt setting templates for all anchor bolts. Provide
instructions for the setting of anchors and bearing plates, verify these items are set correctly as work progresses.

E. Column base plates: Set level to correct elevations, support temporarily on steel wedges, shims, or leveling nuts where shown, until the supported members are plumbed and base plate is grouted.

1. Grout solid the full bearing area under base plates prior to installation of floor and/or roof decks.
2. Comply with manufacturer’s instructions for high strength grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

F. Bolting:

1. Inspect mating surfaces to insure that bolt head and nut will have full bearing and that metal plies will mate flush between bolts.
2. Install bolts in matching holes. Do not distort metal or enlarge holes by drifting during assembly. Remake mismatched components to achieve tolerances indicated.
3. Holes mismatched in excess of 1/8 inch will be rejected.
4. Holes mismatched less than 1/8 inch may be reamed to the next larger size bolt.
5. Do not enlarge holes by flame cutting or air/arc (“plasma”) cutting.
6. Provide flat washer(s) at over-size holes.
7. Provide washer at bolt head and nut where connected part is less than ¼ inch thick.
8. Provide ASTM F436 beveled washers when the slope of the surfaces of parts in contact with the bolt head or nut is greater than 1:20.
9. Do not install bolts with damaged threads.
10. Threads shall commence outside of the shear plane.
11. Machine Bolts (MB): Install and tighten to a snug condition (ST) such that laminated surfaces bear fully on one another, using an impact wrench or “full effort” of an installer using a standard spud wrench.

G. Supports, Shoring and Bracing: Allow for erection loads and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing. Conform to requirements of all applicable laws and governing safety regulations. Resist imposed loads, including those of stored materials and equipment.

1. Provide all temporary supports, shoring and bracing necessary to achieve work of tolerances indicated.
2. Provide all necessary temporary flooring, planking and scaffolding required for erection of steel, and support of erection machinery.
3. Construction Loading: Do not overload the structure or temporary supports with stored materials, equipment or other loads.
4. Maintain temporary bracing and shoring until work is complete, and longer as required to ensure stability and safety of structure.
3.3 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

3.4 FIELD QUALITY CONTROL

A. The independent Testing Agency will perform field quality control tests, as specified in pertinent sections of Division 01.

B. Field Welding Inspection: Conform to all requirements of section SOURCE QUALITY CONTROL.
   1. Inspect mating surfaces.
   2. Test all materials prior to use. Use only materials meeting specified requirements.

3.5 ADJUSTING

A. Touch-up damaged finishes with compatible specified primer.

B. Replace defective or damaged work with conforming work. Replace all defective work at Contractor's expense.

C. Straighten materials by means that will not injure the materials.

D. Replace defective or damaged work which cannot be corrected in the field with new work, or return defective items to the shop for repair.

E. Architect/Engineer shall review all proposals for the repair or replacement of damaged, defective, or missing work.

F. Pay expenses incurred by Owner for Architect/Engineer’s costs for (re-)design and obtaining approvals of Authorities Having Jurisdiction (AHJ) necessitated by incomplete, inefficiently scheduled, improperly performed, defective or nonconforming work, as specified in pertinent sections of Division 01.

G. Pay expenses due to re-testing and re-inspection necessitated by incomplete, inefficiently scheduled, improperly performed, defective or nonconforming work, as specified in pertinent sections of Division 01.

3.6 CLEANING AND PROTECTION
A. Clean all surfaces upon completion of erection; leave free of grime and dirt. Remove unused materials, tools, equipment and debris from the premises and leave surfaces broomed clean.

B. Protect work from damage by subsequent operations.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. All design and other services, material, labor and equipment as necessary for the fabrication, erection and completion of all cold formed metal framing including all bracing and shoring required for erection, miscellaneous metal, and related work.

B. Related Sections:
   1. Pertinent Sections of Division 01 Specifying Quality Control and Testing Agency Sections
   2. Pertinent Sections of Division 05 Specifying Structural Steel.

1.2 REFERENCE STANDARDS

A. California Code of Regulations, Title 24, latest adopted edition (herein noted as CBC): Chapter 22 Steel.

B. American Iron and Steel Institute (AISI) S100 “North American Specification for the Design of Cold-Formed Steel Structural Members”.

C. AISI S200 “North American Standard for Cold-Formed Steel Framing – General Provisions”.

D. AISI D100 “Cold-Formed Steel Design Manual.

E. American Welding Society (AWS) D1.3 “Structural Welding Code – Sheet Steel”

F. American Society for Testing and Materials (ASTM):
   1. ASTM A307 “Stand Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60000 PSI Tensile Strength”.
   3. ASTM A653 “Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process”.

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5. ASTM A1003 “Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members”.

6. ASTM A1008 “Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable”.


8. ASTM C645 “Standard Specification for Nonstructural Steel Framing Members”.


10. ASTM C955 “Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases”.

11. ASTM C1007 “Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories”.

12. ASTM C1513 “Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections”.

G. The Society for Protective Coatings (SSPC) SSPC-Paint20 “Zinc-Rich Coating (Inorganic or Organic)”.

1.3 SUBMITTALS

A. Shop Drawings

1. Show size and locations of all framing members in conformance to the criteria shown on the drawings.

2. Shop and field assembly details, including cuts and connections. All details must reference detail callouts on the construction documents.

3. Type and location of shop and field welds, screws, bolts, and fastening devices.

4. General Contractor shall review and approve shop drawings prior to submittal.

5. Shop drawing submittals that do not meet these requirements will be returned for correction without review.

B. Manufacturer’s Literature:

1. Descriptive data illustrating cold-formed framing system components including framing members, fasteners, and accessories, including ICC-ES reports.

2. Erection instructions containing sequence of operations.

C. Samples: Provide adequate samples of unidentified material to the Owner’s Testing Laboratory for testing purposes.

1.4 QUALITY ASSURANCE
A. Erector Qualifications:
   1. Minimum of three years successful experience on comparable cold-formed metal framing projects.
   2. Welders qualified in accordance AWS D1.3.

B. Cold form carbon and low alloy steel used for structural purposes shall be identified per CBC Section 2202.1.

C. Welding inspections shall conform to AWS D1.3 and CBC 1705.2.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Members of the "Steel Stud Manufacturers Association (SSMA)" with products meeting ICC-ES ESR-3064P. Members of the "Certified Steel Stud Association (CSSA)" with products meeting ICC-ES ESR-3016.

2.2 MATERIALS

A. Steel Framing System:
   1. All stud and/or joist framing members shall be of the type & size as shown on the plans and reviewed shop drawings.
   2. All runner and end tracks, bridging, and non-load bearing studs shall be of the type & size shown on the plans.
   3. All studs, joists, and tracks 54 mils or greater in thickness shall be formed from steel that corresponds to the requirements of ASTM A1003 (Grade ST50H or ST50L) with a minimum yield of 50,000 psi.
   4. All studs, joists, track, bridging, U-channel, (hat) furring (F) channels, and accessories 43 mils or thinner in thickness shall be formed from steel that corresponds to the requirements of ASTM A1003 (Grade ST33H or ST33L) with a minimum yield of 33,000 psi.
   5. All stud and joist components shall be formed from steel having a minimum G-60 galvanized coating (equivalent coatings such as "G60e" are not acceptable), unless noted otherwise, or shall be primed with paint meeting the performance requirements SSPC-Paint20, where noted.
   6. Welding Electrodes: Shall conform to AWS D1.3. E60 or E70. Touch up all welds with zinc-rich paint in compliance with ASTM A780.

B. Screws shall be per ASTM C1513.

C. Machine bolts shall be per ASTM A307.

D. Powder Driven Pins (PDP): Hilti X-U, ICC ESR-2269. For use only where specified by the drawings.

E. Accessories: Cold-formed metal framing manufacturer's standard.
2.3 FABRICATION

A. Form members to manufacturer’s standard shapes meeting design criteria.

B. Cut right angle connections of framing components to fit squarely against abutting members.

C. Prime un-galvanized steel to 1.5 mil (0.038) minimum dry film thickness.

PART 3 - EXECUTION

3.1 ERECTION

A. Clean surfaces that will be in contact after assembly.

B. Position members plumb, square and true to line.

C. Seat studs squarely in track with stud web and flange abutting track web with maximum 1/8 inch gap.

D. Connect members together by welding and/or fasteners in accordance with the drawings.

E. Do not splice studs. Provide “headers” and “trim studs” at openings as required. Studs shall be securely attached to tracks at all exterior walls except as noted below.

F. Provide for expansion and contraction between floors at solid wall sections of two stories or more by providing a slip joint between stud and track at one end. This connection shall be capable of transmitting lateral loads to the structure.

G. Provide and install bridging, fire blocking, etc. per manufacturer’s recommendations, the plans, and code requirements.

H. Perform welding in accordance with AWS D1.3

I. Remove erection bolts and screws used in welded construction.

J. Do not use gas cutting for field correction of fabrication without concurrence of Architect/Engineer.

K. Touch-up field connections and breaks in shop coating with same primer used for shop priming.

3.2 DEFECTIVE WORK AND MATERIALS

A. Work found to be defective, missing or damaged shall be immediately replaced with proper work. Such replaced work and the inspection for same shall be at the expense of the Contractor.
B. Straightening of any materials, if necessary, shall be done by a process and in a manner that will not injure the materials, and which is approved by the Architect. Sharp kinks or bends shall be cause for rejection. Heating will not be allowed.

C. If defects or damaged work cannot be corrected in the field, the material shall be returned to the shop or new parts furnished, as the Architect directs; the Contractor shall replace all work at his own expense.

3.3 CLEANING

A. After erection, all surfaces shall be cleaned and left free of all grime and dirt. Remove unused materials, tools, equipment and debris from the premises and leave broom clean.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide stock and custom fabricated metal items scheduled at end of this Section, complete in respect to function as intended.

1. Metal fabrications includes items made from iron and steel shapes, plates, bars, strips, tubes, pipes, and castings which are not a part of structural steel or metal systems specified elsewhere.

B. Special Coordination for Pre-Engineered Building: Majority of Project consists of pre-engineered building construction with modifications and additions as indicated in Contract Documents.

1. Coordinate with Section 13 34 00 – Pre-Engineered Building.

1.2 REFERENCES


1.3 SUBMITTALS

A. Product Data: Submit manufacturer’s literature for products used in metal fabrications, including paint, grout and manufactured items.

B. Shop Drawings: Submit for fabrication and erection of metal fabrications. Indicate profiles, sizes, connection, reinforcing and anchorage.

1. Provide templates for anchorage installation by others.

PART 2 - PRODUCTS

2.1 MATERIALS

A. System Description: Provide stock and custom fabricated metal items.

B. Steel Shapes, Plates and Bars: ASTM A36.

C. Structural Steel Sheet: Hot rolled, ASTM A1011; or cold rolled, ASTM A1008, Class 1; of grade required for design loading.

D. Steel Pipe: ASTM A53, Type S seamless, grade as selected by fabricator and as required for design loading; minimum standard weight, STD or Schedule 40.

E. Steel Tubing: Cold formed ASTM A500; or hot rolled, ASTM A501; minimum Grade B; seamless where exposed.
F. Castings: Gray iron, ASTM A48, Class 30; malleable iron, ASTM A47.

G. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron ASTM A47, or cast steel ASTM A27. Provide bolts, washers and shims as required, hot-dipped galvanized, ASTM A153.

H. Grout: Non-shrink meeting ASTM C1107, non-metallic, pre-mixed, factory-packaged, non-staining, non-corrosive; type specifically recommended by manufacturer as applicable to job condition.

I. Fasteners and Rough Hardware: Type required for specific usage; provide zinc-coated fasteners.

J. Welding Materials: AWS D1.1, type required for materials being welded.

K. Paint: Provide primers as recommended by paint manufacturers for substrates and paints specified in Section 09 90 00 – Painting and Coating at interior metal fabrications, in Section 09 96 70 – High Performance Coating at exterior.

2.2 FABRICATION

A. Fabricate items with joints neatly fitted and properly secured.

B. Grind exposed welds continuous, smooth and flush with adjacent finished surfaces, and ease exposed edges to approximate 1/32” uniform radius.

C. Exposed Mechanical Fastenings: Flush countersunk fasteners unobtrusively located, consistent with design of structure.

D. Fit and shop assemble in largest practical sections for delivery.

E. Make exposed joints flush butt type, hairline joints where mechanically fastened.

F. Supply components required for proper anchorage of metal fabrications; fabricate anchorage and related components of same material and finish as metal fabrication.

G. Steel Bollards: Minimum Schedule 80 seamless steel piping, filled with minimum 2000 psi concrete.

H. Stainless Steel Corner Guards: Surface mounted ASTM A666, Type 304 stainless steel with satin finish, not less than 18 gage, nominal 3-1/2” by 3-1/2”, 48” high unless otherwise indicated.

I. Galvanized Steel Hose Drying Rack (Alternate): Welded construction; configuration indicated on Drawings.

J. Steel Plate at Overhead Doors: Provide configurations indicated; welded construction; galvanized and prime painted for exterior wall application.
K. Pre-Engineered Support Systems: Provide manufactured pre-engineered support system consisting of minimum 12-gage "C" channel supports with anchors, attachments, and accessories as required for complete installation.

1. Manufacturers:
   a. Unistrut Inc./Unistrut.
   b. Grinnell Corp./PowerStrut.
   c. Thomas & Betts, Inc./Superstrut.
   d. Substitutions: Refer to Section 01 25 00.

2. Finish: Manufacturer’s standard prime paint finish for channel supports; galvanized or similar plated anchors and fasteners; hot-dipped galvanized at exterior exposed applications.

L. Finishes:

1. Interior Metal Fabrications: Prime paint; comply with requirements of Section 09 90 00 - Painting and Coating for preparation and priming.

2. Exterior Metal Fabrications: Hot-dipped galvanized and prime painted; comply with requirements of Section 09 96 70 – High Performance Coating for preparation and priming.

3. Thoroughly clean surfaces of rust, scale, grease, and foreign matter prior to applying finish.

4. Do not shop prime surfaces in contact with concrete or requiring field welding; shop prime in one coat.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible; do not delay job progress; allow for trimming and fitting where necessary.

3.2 ERECTION

A. Obtain Architect’s review prior to site cutting not part of scheduled work.

   1. Perform necessary cutting and altering for installation and coordination with other work.

B. Install items square and level, accurately fitted and free from distortion or defects detrimental to appearance or performance.

   1. Supply items required to be cast into or embedded in other materials to appropriate trades.

   2. Ensure alignment with adjacent construction; coordinate with related work to ensure no interruption in installation.

05 50 00 - 3 Metal Fabrications
C. Make provision for erection stresses by temporary bracing; keep work in alignment.

D. Field bolt and weld to match standard of shop bolting and welding; hide bolts and screws whenever possible, where not hidden, use flush countersunk fastenings.

   1. Perform field welding in accordance with AWS D1.1.

E. After installation, touch-up field welds and scratched and damaged surfaces; use primer consistent with shop coat or recommended for galvanized surfaces, as applicable.

F. Replace items damaged in course of installation and construction.

3.3 SCHEDULE

A. Supply and install metal fabrications listed in Schedule, complete with anchorage and attachments necessary for installation.

   1. Schedule lists principal items only, refer to Drawings for items not listed.

B. Schedule:

   1. Miscellaneous angles, plates, and attachments to be set in concrete or masonry for anchorage of other items.

   2. Iron and steel shapes, sleeves, anchors, connectors, and fastenings required to complete construction work, and which are not provided in other Specification sections.

      a. Rough hardware, including bolts, fabricated plates, anchors, hangers, dowels, and miscellaneous metals.

      b. Angle and channel frames for doors and wall openings.

   3. Steel bollards; hot-dipped galvanize minimum G90 coating.

   4. Stainless steel corner guards.

   5. Galvanized steel hose drying rack (alternate).

   6. Steel plate at overhead doors.

   7. Pre-engineered support systems.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide thermal batt insulation and accessories as required for complete installation.

B. Special Coordination for Pre-Engineered Building: Majority of Project consists of pre-engineered building construction with modifications and additions as indicated in Contract Documents.

1. Coordinate insulation with Section 13 34 00 – Pre-Engineered Building; provide as required to maintain exterior envelope insulation at steel plate at overhead doors.

C. Related Work:

1. Section 09 21 00: Acoustical insulation at gypsum board assemblies.
2. Section 13 34 00: Insulation integral with pre-engineered building.

1.2 SUBMITTALS

A. Product Data: Furnish manufacturer’s literature for each type of insulation.

1. Submit Underwriter’s Laboratory approval numbers for required fire ratings. Approvals of other laboratories contingent upon acceptance of applicable authorities.

1.3 QUALITY ASSURANCE

A. Sustainability Requirements: Comply with CALGreen requirements including those relative to energy efficiency.

PART 2 - PRODUCTS

2.1 MATERIALS

A. System Description: Provide thermal batt insulation with integral vapor retarder and accessories.

B. Thermal Batt Insulation: Preformed slag mineral or glass fiber with thermosetting resin binders, conforming to ASTM C665; formaldehyde-free.

1. Manufacturers:

b. Owens-Corning Fiberglas Corp./Fiberglas FS-25 Foil Faced Insulation.
d. Substitutions: Refer to Section 01 25 00.
2. R-Value: Minimum R-19 at walls, R-38 at horizontal surfaces, unless otherwise indicated.


4. Vapor Retarder: Type I, no vapor retarder.


C. Penetration Type Insulation Supports: Galvanized or electroplated steel penetration supports with adhesive attachment to substrate and support disc.

D. Accessories: Furnish as recommended by insulation manufacturer for insulation types, substrates, and conditions involved.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify substrate and adjacent materials are dry and ready to receive insulation; beginning installation signifies acceptance of conditions.

B. Ensure mechanical and electrical items affecting work are properly placed, complete, and have been inspected by Architect prior to commencement of installation.

3.2 INSTALLATION

A. Install insulation in accordance with manufacturer's instructions with vapor retarder toward inside of building.

B. Cut and trim insulation neatly, to fit spaces.

C. Fit insulation tight within spaces and tight to and behind mechanical and electrical services within insulation plane; leave no gaps or voids; maintain integrity of thermal barrier.

D. Friction fit in place; use tape or penetration supports as necessary to assure permanent installation.

   1. Penetration Supports: Cut or bend pins in exposed locations, to eliminate potential hazards from exposed pin points.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide vapor retarder system for below grade and slab-on-grade concrete, including sealing joints and protrusions through vapor retarder.

B. Special Coordination for Pre-Engineered Building: Majority of Project consists of pre-engineered building construction with modifications and additions as indicated in Contract Documents.

1. Coordinate with Section 13 34 00 – Pre-Engineered Building.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's literature.

1.3 PROJECT CONDITIONS

A. Do not apply vapor retarder during inclement weather or when air temperature is below 40 degrees F.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. Fortifiber Corp./Ultra 15.

B. Stego Industries, Inc./Stego Wrap (15 mil).

C. Raven Industries, Inc./Vapor Block # VB 15 (15 mil Blue).

D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description Includes: Provide vapor retarder system for below grade and slab-on-grade concrete, including sealing joints and protrusions through vapor retarder.

B. Vapor Retarder: ASTM E1745, Class A vapor retarder consisting of 15 mil polyolefin film.

1. Permeance: Maximum 0.025 perms, ASTM F1249 and E154 tests.

2. Resistance to Puncture: Minimum 2200 grams, ASTM D1709, Method B.

4. Tensile Strength: Minimum 35 lbs/in., ASTM E154, Section 9, Method D-882, in both directions.

C. Joint Sealer: Pressure sensitive tape as recommended by vapor retarder manufacturer and providing comparable permeance to vapor retarder.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ensure sleeves, curbs and projections that pass through vapor retarder are properly and rigidly installed.

B. Ensure substrate is free of projections and irregularities that may be detrimental to proper installation of vapor retarder.

3.2 INSTALLATION

A. Apply vapor retarder in accordance with manufacturer’s recommendations and installation instructions and in accordance with ASTM E1643; comply with most restrictive where conflicts occur.

1. Seal items projecting through vapor retarder with pressure sensitive tape.

B. Seams: Minimum 6” overlap, sealed with pressure sensitive tape for vapor tight seal.

C. Lay vapor retarder membrane smooth with no fishmouths or bunches of material.

D. Inspect and repair vapor retarder prior to application of concrete slab; tape tears and repair damage.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide weather-resistive barrier/underlayment air and water barrier systems for maintaining weathertight enclosure at steel plate at overhead doors, and at penetrations, with accessories as required for complete watertight installation.

1. Wall Underlay: Provide vapor permeable sheet membrane underlayment for exterior wall applications, with accessories as required for complete airtight and watertight installation.

2. Flashings and Sheet Metal Underlay: Provide self-adhering sheet membrane underlayment at flashings and sheet metal, with accessories as required for complete watertight installation.

3. Penetrations: Provide flashing for around penetrations through underlayment and through walls not otherwise protected, including accessories as required for complete watertight installation.

a. System: By same manufacturer as underlayment; system may be either fluid-applied or sheet membrane as recommended by underlayment manufacturer.

B. Related Sections:

1. Section 07 60 00: Exposed metal flashing.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Weather Barriers: Provide weather-resistive barrier/underlayment systems which, with other building components, comply with applicable code requirements for air barriers and water barriers.

1. Air Barriers: Air barriers shall be as defined by applicable Energy Code requirements and shall include standard exterior wall components and air seal joint sealants specified in Section 07 90 00 – Joint Sealants.

2. Water Barriers: Water barriers shall be as defined by applicable Building Code requirements and shall include vapor permeable systems with or without rainscreen barriers intended to extend amount of water drained to exterior.

3. Penetrations: Intent of sealing penetrations through underlayment and walls is to ensure water cannot move from exterior surface past water barriers and into building.
B. Pre-Installation Meeting: Convene one week prior to commencing work; require attendance of parties directly affecting underlayment.

1. Review procedures and coordination required with related work.

C. Coordination: Coordinate air and water barrier systems with adjacent materials and assemblies to ensure material compatibility, sequencing, and air and watertight installation is achieved especially related to terminations, transitions, and penetrations.

1.3 SUBMITTALS

A. Product Data: Furnish manufacturer’s literature for each type of underlayment.

B. Samples: Furnish samples of each material.

C. Sustainability Certification Points: Submit information and certifications necessary to achieve maximum points for CALGreen; coordinate and cooperate with Owner and Architect in providing information for certification.

1.4 QUALITY ASSURANCE

A. Sustainability Requirements: Refer to Section 01 35 15 – CALGreen Environmental Requirements.

1. Comply with Green requirements including those relative to finish material pollution control for adhesives and fluid-applied materials (coatings).

1.5 WARRANTY

A. Extended Correction Period: Provide for correcting failure of system to resist damage from anticipated sources including damage from water penetration. Repair system and pay for or replace damaged materials and surfaces.

1. Period: Two years.

PART 2 - PRODUCTS

2.1 MATERIALS

A. System Description: Provide weather-resistive barrier/underlayment air and water barrier systems for siding, sloped roofing, flashing and sheet metal, and penetrations with accessories.

B. Regulatory Requirements: Provide materials conforming to applicable air quality management district limitations on volatile organic compound (VOC) emissions.
C. Wall Underlay: Provide vapor permeable air and water barrier underlayment system for complete watertight installation as recommended by manufacturer for substrates and applications indicated.

1. Self-Adhering Sheet Underlayment Manufacturers:
   c. Carlisle Corp./CCW 705 VP.
   d. Substitutions: Refer to Section 01 25 00.

2. Provide specific materials as recommended by system manufacturers for each type of application.

D. Sheet Metal and Flashing Underlay: Self-adhering rubberized sheet membrane with primers and seam sealers as required for complete watertight installation; type as recommended by manufacturer for substrate and for applications indicated.

1. Manufacturers:
   a. GCP Applied Technologies (Grace).
   b. Henry Company.
   c. Carlisle Corp.
   d. Substitutions: Refer to Section 01 25 00.

2. Provide specific membrane types as recommended by system manufacturers for each type of application.

E. Penetrations: Provide flashing at penetrations with accessories for complete watertight installation; type as recommended by manufacturer for substrate and for applications indicated. System to be compatible with adjacent underlayment materials.

1. Manufacturers: Provide penetration flashing by underlayment manufacturer.

2. Provide specific membrane types as recommended by system manufacturers for each type of application.

F. Accessories: Provide as recommended by underlayment manufacturers for specific applications.

PART 3 - EXECUTION

3.1 PREPARATION

A. Install underlayment over surfaces that are dry, free of ridges, warps and voids that could damage underlayment.

B. Coordinate installation with installation of components and items projecting through underlayment.
3.2 UNDERLAYMENT INSTALLATION

A. Install weather-resistive barrier in accordance with installation instructions and recommendations of each manufacturer and of manufacturers of products to cover weather-resistive barrier; comply with applicable code requirements.


2. Flashing and Sheet Metal: Provide one-layer sheet membrane underlayment.

3. Penetrations: Apply penetration flashing extending minimum 18" from penetrations, including windows and doors; start at bottom of penetration and weatherlap.
   a. Apply to direct water to exterior.

4. Weatherlap joints as recommended by system manufacturer.

5. Secure underlayment in place, stagger joints between sheet membrane layers; lap ends minimum 6"; stagger end joints.

B. Sheet Membranes: Weatherlap items projecting through sheet membrane underlayment and seal with sealer recommended by sheet membrane underlayment manufacturer.

C. Fluid Applied Materials: Prime substrates when recommended by system manufacturer and apply using methods to ensure dry film thickness complies with manufacturer recommendations for each application.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide galvanized steel flashing and sheet metal not provided under other sections and including accessories as required for complete weathertight installation.
   1. Provide flashing and sheet metal to maintain integrity of building at special steel plate at overhead doors.
   2. Provide concealed sealants used in conjunction with installation of metal flashing and sheet metal.

B. Special Coordination for Pre-Engineered Building: Majority of Project consists of pre-engineered building construction with modifications and additions as indicated in Contract Documents.
   1. Coordinate with Section 13 34 00 – Pre-Engineered Building.

C. Related Sections:
   1. Section 07 28 00: Concealed flashing at weather barrier/underlayment.

1.2 REFERENCES


1.3 SUBMITTALS

A. Product Data: Furnish literature for manufactured products.

B. Shop Drawings: Clearly indicate dimensioning, layout, general construction details including closures, flashings, locations and types of sealants, anchorages, and method of anchorage.

C. Samples: Furnish samples of typical metal flashing fabrication indicating standard soldered joints and edge conditions.

1.4 WARRANTY

A. Extended Correction Period: Provide for correcting failure of system to resist damage from anticipated sources including damage from wind and water penetration. Repair system and pay for or replace damaged materials and surfaces.
   1. Period: Two years.
PART 2 - PRODUCTS

2.1 MATERIALS

A. System Description: Provide galvanized steel flashing and sheet metal including reglets and accessories as required for complete weathertight installation.

B. Design Criteria: Allow for movement of components without causing buckling, failure of joint seals, undue stress on fasteners or other detrimental effects, when subject to 100-year seasonal temperature ranges.

C. Flashing and Sheet Metal: ASTM A924 and A653 G90 galvanized steel; minimum 24-gage.
   1. Accessories: Provide as required for a complete system and complying with SMACNA Manual.
   2. Provide heavier gage metal when recommended by SMACNA Manual for size of component.
   3. Mill phosphatized where indicated to be field painted.

D. Solder and Fasteners: As recommended by SMACNA and complying with applicable codes and regulations; hot dipped galvanized minimum coating comparable to G90.

E. Concealed Sealant: Butyl type for use in conjunction with sheet metal; non-staining; non-corrosive; non-shrinking and non-sagging; ultra-violet and ozone resistant for exterior concealed applications.

F. Bituminous Paint: Acid and alkali resistant type; black color; asbestos free.

2.2 FABRICATION


B. Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
   1. Fabricate corners and intersections in shop with solder joints for watertight fabrication.

C. Form sections in maximum 10'-0" lengths; make allowance for expansion at joints.

D. Hem exposed edges on underside 1/2".

E. Back-paint flashings with heavy bodied bituminous paint where in contact with cementitious materials or dissimilar metals.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Install metal flashing and sheet metal in accordance with SMACNA Architectural Sheet Metal Manual.

1. Install tight in place, with corners square, surfaces true and straight in planes, and lines accurate to profiles as indicated on Drawings.

2. Lap joints in direction of water flow.

B. Exercise care when cutting materials on site, to ensure cuttings do not remain on finished surfaces.

C. Provide expansion joints concealed within system.

D. Use concealed fasteners, continuous cleat type, except where specifically approved by Architect.

1. Exposed fasteners may be used, where clearly indicated on shop drawings and approved by Architect, at areas not exposed at exterior walls nor in sight of interior spaces.

E. Apply sealing compound at junction of metal flashing and felt flashing.

F. Lock seams and end joints; fit flashing tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

G. Counter-flash mechanical and electrical items projecting through roof membrane.

H. Install sealants where required to prevent direct weather penetration.

I. Completed installation shall be free of rattles, noise due to thermal and air movement, and wind whistles.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide joint sealants, for interior and exterior joints not specified elsewhere, with backing rods and accessories as required for complete installation.

   1. Joint sealants include joint sealers and calking as indicated.

B. Related Sections:

   1. Section 07 60 00: Concealed sealants at flashing and sheet metal.
   2. Section 09 21 00: Sealants used for acoustical treatment at gypsum board.

C. Special Coordination for Pre-Engineered Building: Majority of Project consists of pre-engineered building construction with modifications and additions as indicated in Contract Documents.

   1. Coordinate with Section 13 34 00 – Pre-Engineered Building.

1.2 SUBMITTALS

A. Product Data: Furnish manufacturer’s descriptive literature.

B. Samples: Furnish samples of each type of exposed joint sealer in required colors.

C. Certifications:

   1. Furnish manufacturer’s certification joint sealers comply with Contract Documents and are suitable for Project applications.

   2. Furnish certification indicating installers are trained in proper use of specified products, qualified, and familiar with proper installation techniques.

1.3 QUALITY ASSURANCE

A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for adhesives, sealants, and caulks.

   1. Provide joint sealants as required by applicable codes and regulations to fill joints and openings in building envelope separating conditioned space from unconditioned space.

B. Installer Qualifications: Firm with minimum five years successful experience on projects of similar type and size, using specified products.

   1. Installers shall be familiar with proper application procedures to ensure maximum joint sealer expansion and contraction capabilities.
1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, cure time, and mixing instructions.

1.5 SITE CONDITIONS

A. Do not proceed with installation of joint sealers under unfavorable weather conditions.

B. Install elastomeric sealants when temperature is in lower third of temperature range recommended by manufacturer.

1.6 WARRANTY

A. Extended Correction Period: Extend correction period to two years.

1. Repair or replace joint sealers which fail to perform as intended, because of leaking, crumbling, hardening, shrinkage, bleeding, sagging, staining, loss of adhesion, and loss of cohesion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. System Description: Provide joint sealants with backing rods and accessories.

B. Performance Requirements:

1. Select materials for compatibility with joint surfaces and indicated exposures.

2. Where not indicated, select modulus of elasticity and hardness or grade recommended by manufacturer for each application indicated.

3. Comply with applicable limitations on volatile organic compound (VOC) emissions.

C. Regulatory Requirements: Comply with applicable regulatory requirements regarding limitations on volatile organic compound (VOC) emissions limitations.

D. Elastomeric Sealants:

1. Single Component Low Modulus Silicone Sealant: ASTM C920 Type S, Class 25, Grade NS; minimum 50% expansion and compaction capability.

a. Provide at exterior locations not exposed to traffic.

b. Manufacturers:

1) General Electric Co./Silpruf, Silglaz or GESIL.
2) Dow Corning Corp./790 or 795.
3) Pecora Corp./864 Architectural Silicone.
4) Tremco/Spectrem 3.
5) Substitutions: Refer to Section 01 25 00.
   a. Provide at traffic bearing locations.
   b. Manufacturers:
      1) Pecora Corp./Urexpan NR-200, or Dynatrol II-SG.
      2) Tremco/THC 900-901, or Vulkem 245.
      3) BASF/Sonnelastic SL 2
      4) Substitutions: Refer to Section 01 25 00.

3. Mildew-Resistant Silicone Rubber Sealant: ASTM C920, Type S, Grade NS, Class 25, compounded with fungicide, specifically for mildew resistance and recommended for interior joints in wet areas.
   a. Provide at interior joints in wet areas.
   b. Manufacturers:
      1) General Electric Co./SCS 1702 Sanitary Sealant.
      2) Dow Corning Corp./786 Bathtub Caulk.
      3) Pecora Corp./898 Sanitary Mildew Resistant Sealant.
      4) Tremco/Tremsil 200.
      5) Substitutions: Refer to Section 01 25 00.

E. Non-Elastomeric Sealants:

1. Acrylic-Emulsion Sealant: ASTM C834 acrylic or latex-rubber-modified acrylic sealant, permanently flexible, non-staining and non-bleeding; recommended for general interior exposure; compatible with paints specified in Section 09 90 00.
   a. Provide at general interior applications.
   b. Manufacturers:
      1) Pecora Corp./AC-20.
      2) BASF/Sonolac.
      3) Tremco/Tremflex 834.
      4) Substitutions: Refer to Section 01 25 00.

2. Air Seals: Provide non-staining and non-bleeding sealers, cauls, or foams appropriate to specific applications for filling openings between conditioned and unconditioned spaces.
   a. Type: As recommended by manufacturer for each specific application; compatible with adjacent materials.
   b. Manufacturers:
      1) Dow/Great Stuff.
      2) Owens Corning/EnergyComplete Air Sealant.
      3) Grace/Polycel One.
      4) Substitutions: Refer to Section 01 25 00.
F. Miscellaneous Materials:

1. Primers/Sealers: Non-staining types recommended by joint sealer manufacturer for joint surfaces to be primed or sealed.

2. Joint Cleaners: Non-corrosive types recommended by joint sealer manufacturer; compatible with joint forming materials.

3. Bond Breaker Tape: Polyethylene tape as recommended by joint sealer manufacturer where bond to substrate or joint filler must be avoided for proper performance of joint sealer.

4. Sealant Backer Rod: Compressible polyethylene foam rod or other flexible, permanent, durable non-absorptive material as recommended by joint sealer manufacturer for compatibility with joint sealer.
   a. Oversize backer rod minimum 30% to 50% of joint opening.

G. Colors: Provide colors indicated or as selected by Architect from manufacturer's full range of colors.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare joint surfaces in accordance with ASTM C1193 and as recommended by joint sealer manufacturer.

B. Clean joint surfaces immediately before installation of joint sealer; remove dirt, insecure materials, moisture and other substances which could interfere with bond of joint sealer.

C. Prime or seal joint surfaces where recommended by joint sealer manufacturer; do not allow primer/sealer to spill or migrate onto adjoining surfaces.

D. Ensure protective coatings on surfaces in contact with joint sealers have been completely stripped.

3.2 INSTALLATION

A. Comply with manufacturer's printed instructions and ASTM C1193, except where more stringent requirements are shown or specified.

B. Set sealant backer rods at proper depth or position in joint to coordinate with other work, including installation of bond breakers and sealant; do not leave voids or gaps between ends of backer rods.
   1. Do not stretch, twist, puncture or tear backer rods.

C. Install bond breaker tape as required to avoid three-sided bond of sealant to substrate and where required by manufacturer's recommendations to ensure joint sealers will perform properly.

D. Size materials to achieve required width/depth ratios.
E. Employ installation techniques that will ensure joint sealers are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of bond surfaces equally on opposite sides.

F. Joint Configuration: Fill sealant joint to a slightly concave surface, slightly below adjoining surfaces, unless otherwise indicated.

G. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture or dirt.

H. Install joint sealers to depths recommended by joint sealer manufacturer but within the following general limitations, measured at center (thin) section of bead.
   1. Horizontal Joints: 75% width with minimum depth of 3/8”.
   2. Elastomeric Joints: 50% width with minimum depth of 1/4”.
   3. Non-Elastomeric Joints: 75% to 125% of joint width.

I. Spillage: Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surfaces.
   1. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.

J. Cure joint sealers in compliance with manufacturer’s instructions and recommendations to obtain high early bond strength, internal cohesive strength, and surface durability.

K. Maintain finished joints free of embedded matter, ridges, and sags.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide full flush steel (hollow metal) doors and pressed steel frames, including anchors and silencers.

B. Related Sections:

1. Section 08 71 00: Door hardware.

C. Special Coordination for Pre-Engineered Building: Majority of Project consists of pre-engineered building construction with modifications and additions as indicated in Contract Documents.

1. Coordinate with Section 13 34 00 – Pre-Engineered Building which includes exterior windows.

1.2 REFERENCES

A. Steel Door Institute (SDI): SDI-100 (ANSI/SDI A250.8) - Recommended Specifications - Standard Steel Doors and Frames.


C. Underwriters Laboratories: Standards as applicable to fire rated doors and frames.

1. Materials tested, labeled, and inspected by Warnock Hersey International are acceptable upon approval of authorities.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate hardware installation with Section 08 70 00 - Hardware.

1.4 SUBMITTALS

A. Product Data: Submit manufacturers' literature.

B. Shop Drawings: Indicate general construction, configuration, jointing methods, reinforcements, anchorage methods, hardware locations, and locations of cut-outs.
PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. The Ceco Corporation.
B. Republic Doors and Frames.
C. Curries Division Assa Abloy Door Group.
D. Amweld Building Products Inc.
E. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description: Provide full flush steel (hollow metal) doors and pressed steel frames, including anchors and silencers.

B. Doors: Hollow metal flush steel door, 1-3/4" thick.
   1. Typical: Full flush with steel channel or welded edge; close top with flush end closer treatment, bottom optional flush, or recessed channel; steel stiffened core, insulated at exterior doors; continuous welded seam.
   2. Interior Doors: Minimum 0.042" (18-gage).
   3. Exterior Doors: Minimum 0.053" (16-gage).

C. Frames:
   1. Exterior Frames: Welded (pre-assembled) type; minimum 0.067" (14-gage).
   2. Interior Frames: Knockdown (field-assembled) type; provide 3/8" back bend return on frames at gypsum board, minimum 0.053" (16-gage).
   3. Door Silencers: Manufacturer's standard resilient type; removable for replacement.

D. Fire Rated Units: Comply with Wildland-Urban Interface Fire Area requirements in California Building Code, Chapter 7 for exterior doors and frames. Construct in accordance with requirements for fire rating, NFPA 252 or UL 10C, and NFPA 80.
   1. Labels: Place fire rating labels where visible when doors and frames are in installed, opened position.

2.3 FABRICATION

A. Conform to requirements of SDI (ANSI A250 Series) or NAAMM.
B. Reinforce and prepare doors and frames to receive hardware.
   1. Refer to Section 08 70 00 for hardware requirements.
C. Welded Frames: Accurately form and cut mitered corners of welded type frames; continuously weld on inside surfaces (fully welded); grind welded joints to smooth uniform finish.
D. Knocked Down Frames: Accurately form and miter interlocking joints of knocked down frames to maintain hairline alignment of parts when field assembled.

E. Door Silencers: Place three single bumpers on single door frames; space equally along strike jambs.

F. Provide jamb anchors per SDI-100 (ANSI/SDI 250.8) and NAAMM; weld floor jamb anchors in place.

G. Edge Clearances:
   1. Between Doors and Frames: Maximum 1/8" at head and jambs.
   2. Door Sills (No Threshold): Maximum 3/8".
   3. Fire Rated Doors: As required for fire ratings.

H. Finish:
   1. Interior Units: Prime paint. Comply with requirements of Section 09 90 00 – Painting and Coating for primer including application and compatibility with specified finishes.
   2. Exterior Units: Hot-dipped galvanized and prime painted. Comply with requirements in Section 09 96 70 – High Performance Coating for primer including application and compatibility with specified finishes.
      a. Apply minimum A60 non-spangle galvanized coating, ASTM A924 and A653.
      b. Surface treat after galvanizing to remove oils and prepare for prime painting.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install doors and frames in accordance with SDI-100 (ANSI/SDI A250.8) and ANSI/SDI A250.11 or NAAMM "Hollow Metal Manual" and with manufacturer's recommendations and installation instructions.
   1. Install fire rated units in conformance with fire label requirements and NFPA 80.

B. Install doors and frames plumb and square, and with maximum diagonal distortion of 1/16".

C. Remove and replace doors and frames damaged during delivery, storage, installation, and construction.
   1. Paste filler repair shall not be permitted.

D. After installation, touch-up scratched paint surfaces.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide aluminum sectional overhead doors with frames, solid infill panels, glass infill, brackets, guides, tracks, counterbalance, hardware, electric operators, and accessories for complete finished, operational installation.

1. Provide system to suit openings and allowable head room.

2. Provide electrical wiring from make-up box to electrical operator and control wiring to safety devices and control stations.

B. Alternates: Refer to Section 01 15 00 – Measurement and Payment with Alternates.

C. Related Sections:

1. Section 05 50 00: Special steel plate at overhead door openings.
2. Section 13 34 00: Pre-engineered building with steel sectional doors (Base Bid).
3. Division 26: Electrical service to make-up box on operator.

D. Special Coordination for Pre-Engineered Building: Majority of Project consists of pre-engineered building construction with modifications and additions as indicated in Contract Documents.

1. Coordinate with Section 13 34 00 – Pre-Engineered Building which includes exterior doors, windows, and hardware.

1.2 SUBMITTALS

A. Product Data: Furnish manufacturer’s literature.

B. Shop Drawings: Submit shop drawings for special components and installation which are not fully detailed on manufacturer’s data sheet.

1. Submit setting drawings, templates, and directions for anchorage device installation.

C. Samples: Furnish samples of aluminum with required finish.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. Overhead Door Corporation.

B. Raynor Manufacturing Co.

C. Windsor Door, a United Dominion Company.

D. Substitutions: Refer to Section 01 25 00.
2.2 MATERIALS

A. System Description: Provide aluminum sectional overhead doors with frames, aluminum infill panels, brackets, guides, tracks, counterbalance, hardware, electric operators, and accessories.


B. Performance Criteria, Wind Loads: Design and reinforce doors to withstand not less than 20 psf wind loads.

C. Door Sections: 1-3/4" thick, ASTM B221, 6063-T6 extruded aluminum, minimum 0.06" thick.

1. Stiles and Rails: Manufacturer's standard sizes as recommended for door sizes indicated.

2. Solid Panels: Minimum 0.05" thick aluminum sheet finished to match stiles and rails.

3. Seals: Provide seals between each door section for weather-tight closure between sections.

4. Finish: Manufacturer's standard clear anodized finish.

D. Insulated Glass: Preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space with minus 20-degree F dew point.

1. Performance Classification: ASTM E774, Class A.

2. System: Manufacturer's standard dual seal system compatible with glazing system, and including spacers, desiccant, and standard corner construction.


4. Thickness: Maximum available for door system".

E. Glazing Materials: Manufacturer’s standard types for glazing installation; designed to maintain glass in place and prevent movement. Glass shall not touch metal surfaces.

F. Track: Galvanized track 2" or 3" depending on door size and as recommended by door manufacturer.

1. Tracks: Bracket-mounted or continuous angle mounted and fully adjustable for sealing door to jamb; reinforce horizontal track with continuous angle.

G. Hardware: Hinges and brackets made from galvanized steel; track rollers hardened steel balls of size suited to size of track.

H. Spring Counterbalance: Heavy duty (100 thousand cycles or more) oil tempered wire torsion springs on continuous ball bearing cross header shaft; galvanized aircraft type lifting cables.
I. Weatherstripping:

1. Floor Seal: U-type vinyl seal and extruded aluminum retainer.

2. Header Seal: Neoprene rubber seal held in place by galvanized steel retainer and bolted to top section.

3. Jamb Seal: Neoprene rubber, designed to seal side of door when closed; mounted between jamb and continuous angle mounting.

J. Inserts and Anchorage: Provide complete anchorage system for doors; furnish inserts and anchoring devices which must be set in concrete or built into masonry for installation of units.

1. Secure aluminum infill panels to frames using concealed fastener system as approved by Architect.

K. Electric Door Operators:

1. Furnish heavy duty electric door operator assembly of size and capacity recommended and provided by door manufacturer.
   a. Provide complete with electric motor and factory-wired motor controls, gear reduction unit, solenoid operated brake, clutch, remote control stations and control devices.
   b. Provide adjustable friction clutch double shoe brake system actuated by independent full line voltage solenoid controlled by motor starter, fully enclosed positive gear driven limit switch.
   c. Starter: Fully enclosed magnetic cross line reversing starter.

2. Provide hand-operated disconnect or mechanism for automatically engaging sprocket chain operator and releasing brake for emergency chain drive manual override operation.
   a. Include interlock device to automatically prevent motor from operating when emergency sprocket is engaged.

3. Design operator so motor may be removed without disturbing limit-switch adjustment.

4. Control Station: Provide continuous-contact, 3-button control station with push button controls labeled "open", "close" and "stop"; coordinate control station with electrical work; flush mounted.

5. Photo Electric Safety System: Provide complete photo electric safety system with 24-volt power supply under this section.

6. Safety Switches: Provide wireless full width type safety switches at bottom of doors to reverse door upon striking object; neoprene covered to provide weather seal.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Install sectional door in accordance with manufacturer’s instructions.
   1. Install door, track and operating equipment complete with necessary hardware, jamb and head mold stops, anchors, inserts, hangers and equipment supports.

B. Fasten vertical track assembly to framing; hang horizontal track from structural overhead framing with angle or channel hangers, welded and bolt-fastened in place.

C. Provide sway bracing, diagonal bracing and reinforcing as required for rigid installation of track and door operating equipment.

D. Upon completion of installation, lubricate, test, and adjust doors to operate easily, free from warp, twist, or distortion and fitting weather-tight for entire perimeter.

E. Remove and replace damaged glazing, including glazing with scratches.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide aluminum-framed storefront systems with anchorage, glazing, and accessories as required for complete installation.

B. Alternates: Refer to Section 01 15 00 – Measurement and Payment with Alternates.

C. Related Sections:
   1. Section 07 90 00: Perimeter sealants and back-up materials.
   2. Section 08 36 10: Aluminum sectional overhead doors.

D. Special Coordination for Pre-Engineered Building: Majority of Project consists of pre-engineered building construction with modifications and additions as indicated in Contract Documents.
   1. Coordinate with Section 13 34 00 – Pre-Engineered Building which includes exterior doors, windows, and hardware.

1.2 REFERENCES


1.3 ADMINISTRATIVE REQUIREMENTS

A. Design/Build: Provide special engineering for storefronts to ensure they comply with applicable codes and Contract Documents.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's literature.

B. Shop Drawings: Indicate pertinent dimensioning, general construction, component connections and locations, anchor methods and locations, and relevant details.

C. Samples: Furnish samples of metal finish, glass, and glazing gasket.

D. Design/Build Certificates: Submit certification signed by California licensed structural engineer indicating compliance with Contract Documents and code requirements.
1.5 QUALITY ASSURANCE

A. Sustainability Requirements: Comply with CALGreen requirements including those relative to energy efficiency.

B. Installer Qualifications: Manufacturer or firm with minimum five years successful experience in the installation of systems similar to type and size required for Project and approved by manufacturer.

1.6 WARRANTY

A. Extended Correction Period: Provide for correcting failures including wind damage and water penetration to interior surfaces, excessive deflections, and deterioration of finishes, weather-stripping and accessories.

   1. Period: Two years.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. Kawneer Company, Inc.

B. Oldcastle Building Envelope.

C. Arcadia, Inc.

D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description: Provide aluminum-framed storefront systems, with anchorage, glazing, and accessories.

B. Regulatory Requirements, General: Comply with requirements of applicable codes.


   1. Manufacturer shall be responsible for providing information required by authorities necessary to verify conformance.

   2. Entire assembly, including glass and glazing, shall be certified by the National Fenestration Rating Council (NFRC) and shall bear NFRC Label indicating energy performance technical information.
D. Design Criteria: Comply with recommendations of AAMA Aluminum Store Front and Entrance Manual except where more stringent requirements are specified.

1. Deflection: Maximum L/175, ASTM E330.
   a. Safety Factor: Design for specified pressures with no glass breakage, no permanent damage to fasteners, and no permanent deformation of framing exceeding 0.2% of member clear span.

2. Water Penetration: No uncontrolled water penetration, ASTM E331, with no water on exposed interior components; static pressure differential of 20% of inward wind load, with minimum 6-psf load.

3. Air Leakage: Maximum 0.06-cfm/sf, ASTM E283, at differential static pressure of 6.24-psf at fixed glazing.

E. Performance Criteria: Design assemblies capable of withstanding minimum uniform test pressures as required by applicable codes when tested in accordance with ASTM E330.

F. Aluminum-Framed Storefront Systems: Systems with profiles as indicated on Drawings; provide extruded aluminum security type glass stops of profile to suit frame design.

1. Aluminum Type: As recommended by manufacturer for application indicated, but not less than extruded aluminum, ASTM B221, 6061 or 6063 alloy and T5 or T6 temper.

2. Finish, Clear Anodized: Clear anodized coating conforming with NAAMM Metal Finishes Manual, Architectural Class I, 0.7 mil or greater.

G. Glass: Provide minimum thicknesses specified, but no less than thicknesses required based on window size and configuration and anticipated wind loading.

1. Manufacturers:
   a. Vitro Architectural Glass.
   b. Oldcastle Glass.
   c. Guardian Industries Corp.
   d. Viracon.
   e. Substitutions: Refer to Section 01 25 00.

2. Insulated Glass: Preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space with minus 20-degree F dew point.
   b. System: Manufacturer’s standard dual seal system compatible with glazing system, and including spacers, desiccant, and standard corner construction.
   c. Tempered Glass: Select glazing quality, clear float glass, fully tempered, ASTM C1048, Kind FT; nominal thickness 1/4”; safety glass.
   d. Total Unit Thickness: 1”.
H. Glazing Accessories: Of type recommended by manufacturer to suit security locations and applications for dry glazing installation.

1. Setting Blocks: Neoprene or EPDM, 80-90 Shore A durometer hardness; 4” long by 3/8” thick by 1/4” high; ASTM C864.

2. Spacer Shims: Neoprene or EDPM; 45-55 Shore A durometer hardness; 3” long by 3/32” thick by 1/4” high; ASTM C864.

3. Edge Blocks: Neoprene or EPDM, 60-70 Shore A durometer hardness; 4” long with minimum two per jamb located at top and bottom edges of glass; ASTM C864.

4. Glazing Gaskets: Exterior neoprene or EDPM; interior neoprene, EPDM or vinyl; miter corner joints; ASTM C509 or C864.

I. Miscellaneous Materials:

1. Fasteners: Aluminum or non-magnetic stainless steel of type which will not cause electrolytic action or corrosion.
   a. Do not use exposed fasteners except where unavoidable for assembly or for application of hardware.
   b. Indicate exposed fasteners on shop drawings for specific approval; exposed fasteners shall be Phillips flat-head screws or Allen screws with finish matching item fastened.
   c. Provide concealed fasteners for glazing stops.

2. Steel Reinforcement and Brackets: Manufacturer's standard with minimum 2 oz. hot-dip zinc coating, ASTM A123, applied after fabrication.

3. Bituminous Paint: Cold-applied mastic, SSPC Paint 12, compounded for 30 mil thickness per coat.

4. Flashing: Provide sub-sill flashing members; minimum 22 gage sheet aluminum of sizes and shapes indicated and as required to drain water to exterior; match adjacent aluminum member finish.

5. Anchoring Devices: Corrosion resistant type capable of supporting entrance system and superimposed design loads; design to allow adjustments of system prior to being permanently fastened in place.

2.3 FABRICATION

A. Fabricate aluminum storefront systems to allow for clearances and shim spacing around perimeter of assemblies to enable installation; provide for thermal movement.

B. Provide anchorage devices to securely and rigidly fit entrance assemblies in place.

C. Accurately fit together joints and corners; match components ensuring continuity of line and design; ensure joints and connections are flush, hairline and weatherproof.
D. Provide structural reinforcing within framing members where required to maintain rigidity and as required to accommodate design loads.

E. Allow moisture entering joints and condensation occurring within frame construction to drain to exterior.

F. Complete cutting, fitting, forming, drilling, and grinding of metal work prior to cleaning, finishing, treatment, and application of coating.

G. Finishing: After fabrication, prepare surfaces for finishing in accordance with recommendations of aluminum producer and finish manufacturer.

H. Weld by methods recommended by metal manufacturer and AWS; grind exposed welds smooth and restore mechanical finish; remove arises from cut edges and corners to a radius of approximately 1/64”.

I. Fit and assemble work at shop to greatest extent possible; disassemble only as required for shipment and erection.

J. Reinforce work as necessary for performance requirements and for support.

K. Provide internal reinforcing for hardware.

L. Separate dissimilar materials with bituminous paint or preformed separators which will prevent corrosion.

M. Separate metal surfaces at moving joints with plastic inserts or other non-abrasive concealed inserts which permanently prevent "freeze-up" of joint.

N. Apply coat of bituminous paint on concealed aluminum surfaces to be in contact with cementitious and with dissimilar materials.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install aluminum framed storefront assemblies in accordance with manufacturer’s recommendations and installation instructions and to meet design criteria and performance criteria indicated, for weather-tight installation.

   1. Separate aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

B. Ensure assemblies are plumb, level, and free of warp or twist; maintain dimensional tolerances and alignment with adjacent work.

   1. Maximum Variation from Plane or Location: 1/8" in 12'-0", with maximum 1/2" variation in total length.

   2. Maximum Offset Between Members: 1/16”.

C. Use sufficient anchorage devices to secure and rigidly fasten assemblies to building.
   
   1. Do not allow glass to touch metal surfaces.

3.2 CLEANING

A. Clean aluminum surfaces promptly after installation of components, exercising care to avoid damage of finish.

B. Mark glass after installation by crossed streamers attached to framing and held away from glass; do not apply markers to surface of glass.

C. Remove nonpermanent labels immediately after sealant cures and cure sealants for high early strength and durability.

3.3 PROTECTION

A. Remove and replace glass which is broken, chipped, cracked, abraded, or damaged during construction period, including natural causes, accidents, and vandalism.
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide hardware for hollow metal doors.
   1. Provide cylinders for doors provided without lock cylinders.
   2. Hardware Schedule: Contractor hired Architectural Hardware Consultant (AHC) to verify Hardware Schedule based on requirements in Contract Documents and applicable codes and regulations.

B. Related Sections:
   1. Section 08 11 10: Door silencers at pressed steel frames.
   2. Section 08 36 10: Sectional overhead door hardware.
   3. Section 09 30 00: Stone threshold at Restroom tile floor.
   4. Review other sections for doors fabricated with hardware.

C. Special Coordination for Pre-Engineered Building: Majority of Project consists of pre-engineered building construction with modifications and additions as indicated in Contract Documents.
   1. Coordinate with Section 13 34 00 – Pre-Engineered Building including hardware for exterior hollow metal doors.

1.2 REFERENCES

A. ANSI A115 Series: Door and Frame Preparation Standards.
B. ANSI A156.1 through A156.20: Standards for various hardware items.
D. Americans with Disabilities Act (ADA) Standards.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Hardware Schedule: Contractor to verify Project Hardware Schedule based on requirements in Contract Documents with Architectural Hardware Consultant (AHC) with not less than five years successful experience in scheduling hardware.
   1. AHC may be independent or may be employed by manufacturer or supplier.

B. Coordination: Coordinate hardware installation doors including but not necessarily limited to following.
   1. Coordinate hardware installation with hollow metal doors and frames installation in Section 08 11 10.

C. Pre-Installation Meeting: Convene pre-installation meeting prior to commencing work of this section. Include persons involved with installation of doors, frames, and hardware.
1.4 SUBMITTALS

A. Product Data: Submit catalog cuts for each type of hardware clearly marked to indicate hardware type to be provided, style, finish, and options.
   1. Supply templates to door and frame manufacturers for proper and accurate sizing and locations of cut-outs for hardware.

B. Shop Drawings: Indicate locations and mounting heights of hardware.

C. Samples: Indicate required style and finish of exposed door hardware.

D. Keying Schedule: Coordinate directly with Owner’s Representative.

E. AHC Certification: Submit certification by AHC indicating hardware complies with applicable codes and Contract Documents.

F. Closeout Submittal: Record actual locations of installed cylinders and master key codes on Project Record Documents.

G. Maintenance Materials: Submit manufacturer’s parts list and maintenance instructions for each type of hardware supplied and necessary wrenches and tools required for proper maintenance of hardware.

1.5 QUALITY ASSURANCE

A. Supplier Qualifications: Recognized builder’s hardware supplier with minimum five years successful experience in scheduling and furnishing hardware.
   1. Provide services of architectural hardware consultant to supervise hardware supply.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver hardware in manufacturer’s original packages, marked for intended opening and use.

B. Pack with necessary screws, bolts, keys, instructions, and installation template, if necessary, for spotting mortising tools.

C. Upon delivery, furnish complete list of hardware for checking, clearly marked to correspond with marking on each package.
   1. Review list for completeness and accuracy.
2.1 MATERIALS

A. System Description: Provide door hardware and accessories as required for complete operational installation.

1. Review Drawings for door locations and types; comply with following general requirements; inform Architect where conflicts occur.

2. Provide hardware items with accessories complete to door function as intended, as specified, and as required by applicable codes and regulations.

3. Provide heavy duty commercial grade units of each type of hardware (hinges, pivots, locksets, latchsets, closers, trim) from single manufacturer unless otherwise indicated.


C. Design Requirements:

1. Finishes: Provide finishes to match: other hardware on same door; hardware on other doors in same area; and as required to match other metal finishes in same room such a white metal finishes in bathrooms with chrome fixtures.

2. Security: Coordinate security requirements such as locking, electrically controlled hardware, and electric monitoring devices directly with Owner and Owner’s security consultant.

3. Complete Sets: Provide complete sets of hardware for each door considering requirements for both sides of doors and including coordinating devices and accessories as would normally be anticipated for specific door applications.

D. Performance Criteria (Acoustical Gasket at Restroom): Provide acoustic hardware capable of achieving maximum possible acoustic performance, sound transmission class (STC) ratings based on door type, frame type, and hardware types specified.

1. Base results on verified testing of similar assemblies using ASTM E90 testing and E413 classification for rating sound insulation.

E. Hinges and Butts: ANSI A156.1; comply with following unless otherwise indicated.

1. Manufacturers:
   a. Hager Hinge Co.
   b. Lawrence Brothers Inc.
   c. McKinney Products Co., Div of ASSA ABLOY.
   d. Stanley Hardware Division of Stanley Works.
   e. Substitutions: Refer to Section 01 25 00.
2. Doors 1-3/4" Thick: 4-1/2" heavy weight, extra heavy weight ball or oilite bearing where over 40" wide.
   a. Provide widths sufficient to clear trim projection when door swings 180 degrees.
3. Provide minimum three hinges to 90" high for each door leaf unless otherwise indicated.
4. Provide nonferrous butts with non-removable pins at exterior and locked outswinging doors, non-rising at interior doors; stainless steel where labeled; steel butts at labeled interior doors.
5. Provide ball bearing or oilite bearing hinges at doors with closers.

F. Locking Devices: Provide of metal matching specified finish; interior parts of steel and zinc-dichromate plating, to resist rusting and corrosion; do not supply plastic, die-cast or aluminum mechanisms.

1. Manufacturers:
   b. Sargent Manufacturing Co., Division of ASSA ABLOY Group.
   e. Substitutions: Refer to Section 01 25 00.

2. Type: Provide locksets with not less than 6 pin tumbler cylinders unless higher level of security is required by Owner.
   a. Mortise Locksets: ANSI A156.13, Series 1000, Grade 1, Mortise Type.
      1) Provide at exterior doors.
   b. Cylindrical Locksets: ANSI A156.2, Series 4000, Grade 1, Bored Type (cylindrical).
      1) Provide at privacy locksets at restroom doors.

3. Lockset and Latchset Design: Solid lever with rose, as selected by Architect.

4. Backset: 2-3/4".

5. Strikes: Furnish standard strikes with extended lips where required to protect trim from being marred by latch bolt; verify type of cutouts provided in metal frames.
G. Closers: Provide at exterior doors (fire rated). ANSI A156.4, furnish products of one manufacturer; full rack and pinion type with steel spring and non-freezing hydraulic fluid.

1. Manufacturers:
   a. LCN Closers Division Ingersoll Rand/4000 Series.
   b. Norton Division, ASSA ABLOY/7500 Series.
   c. Dorma Door Controls/8900 Series Full Cover.
   d. Substitutions: Refer to Section 01 25 00.

2. Provide controls for regulating closing, latching, speeds and back check.

3. Arm types shall suit individual conditions, as approved; supply parallel-arm closers at reverse bevel doors and where doors swing full 180 degrees.

4. Mount closers on room side or pull side unless otherwise indicated.

5. Sizes: Adjustable to following maximum 15 pounds door operating pressures as required by applicable authorities:

6. Design: ANSI Modern Type with Cover, unless otherwise indicated.

H. Thresholds, Stops, Trim, and Miscellaneous Hardware: Provide as indicated, as specified, as included in Hardware Schedule, and as required for complete installation.

1. Manufacturers:
   a. Adams Rite Div. ASSA ABLOY.
   b. Builders Brass Works Corp.
   d. Ives Div. Ingersoll Rand.
   e. National Guard Products.
   f. Pemko Mfg. Co. Div. ASSA ABLOY.
   g. Zero International, Inc.
   h. Substitutions: Refer to Section 01 25 00.

2. Door Stops: Required at all doors; locate as indicated, as required to minimize trip hazard and obstruction as approved and where not otherwise indicated.

3. Kick Plates: Provide at interior hollow metal doors. Height indicated by 1" less than door width; minimum 0.050" thick.

2.2 ACCESSORIES

A. General: Provide complete hardware with accessories as required for doors and applications indicated.

B. Templates: Furnish templates or physical hardware items to manufacturers concerned sufficiently in advance to avoid delay in Work.

C. Reinforcing Units: Furnished by door manufacturer, coordinated by hardware manufacturer.
D. Fasteners: Furnish as recommended by manufacturer and as required to install secure hardware.

1. Finish: Match hardware.

2. Furnish screws for items applied on gypsum board sufficiently long to provide solid connection to framing or backing.

E. Through Bolts: Through bolts and grommet nuts shall be avoided on door faces in highly visible areas, unless no alternative is possible, as directed and approved, and shall not be used for solid wood core doors.

F. Electrical and Mechanical: Make provisions and coordinate requirements for mechanical and electrical devices in connection with hardware.

2.3 FINISHES

A. General: Provide following finishes except where otherwise indicated.


C. Interior Doors: BHMA 626 (US26D), satin chromium plated.

D. Closers: BHMA 600 (USP), primed for painting.

E. Thresholds: BHMA 628 (US28), satin aluminum, clear anodized, except where otherwise indicated (stone threshold at tile flooring specified in Section 09 30 00).

F. Other Items: Provide manufacturer's standard finishes matching similar hardware types on same door, and maintain acceptable finish considering anticipated use.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install finish hardware specified under this section and coordinate with manufacturer and installation of doors and frames.

B. Fit hardware prior to painting. Remove for painting of doors and frames before final installation of hardware.

C. Install hardware in accordance with manufacturer's instructions.

D. No extra cost will be allowed because of changes or corrections necessary to facilitate installation of hardware.

3.2 MOUNTING POSITIONS

A. General: Heights given are center line heights from finished floor; comply with following unless otherwise required by applicable codes or regulations.

1. Locks and Latches: 38” to center of lever.
2. Top Hinge: To jamb manufacturer's standard, but not greater than 10" from head of frame to center line of hinge.

3. Bottom Hinge: To jamb manufacturer's standard, but not greater than 12-1/2" from floor to center line of hinge.

4. Intermediate Hinges: Equally spaced between top and bottom hinges and from each other.

5. Hinge Mortise on Door Leaf: 1/4" to 5/16" from stop side of door.

B. Standards: Comply with recommendations of Builders Hardware Manufacturers Association, subject to approval, for heights of items not indicated.

3.3 ADJUSTING

A. Qualified hardware supplier's or manufacturer's representatives shall inspect installation and adjust as needed for proper operation.

1. Adjust closers, locks, and critical operational hardware.

2. Deliver instructions for maintenance and future adjustments to Owner's Representative.

3.4 HARDWARE SCHEDULE

A. The Hardware Schedule or Hardware Groups shall be prepared by an Architectural Hardware Consultant hired by Contractor.

1. AHC to Examine Drawings and Specifications and furnish proper hardware for door openings.

B. Examine Drawings and Specifications and furnish proper hardware for door openings.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide gypsum board systems including gypsum board, light gage metal framing, suspension system for gypsum board systems, joint treatment, acoustical accessories, and general accessories for complete installation.

B. Related Sections:
   1. Section 05 40 00: Cold-formed metal framing.
   2. Section 09 30 00: Cementitious backer unit tile substrates.

C. Special Coordination for Pre-Engineered Building: Majority of Project consists of pre-engineered building construction with modifications and additions as indicated in Contract Documents.
   1. Coordinate with Section 13 34 00 – Pre-Engineered Building.

1.2 REFERENCES

A. ASTM C754: Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board, or Water-Resistant Backing Board.

B. ASTM C840: Application and Finishing of Gypsum Board.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination, Openings: Obtain dimensions and locations from other trades and provide openings and enclosures for accessories, specialties, equipment, and ductwork.

1.4 SUBMITTALS

A. Product Data: Furnish manufacturer’s literature for framing, insulation, gypsum board, and acoustical accessories.

B. Manufacturer’s Certification: Furnish manufacturer’s certification indicating products comply with Contract Documents and applicable codes.

1.5 QUALITY ASSURANCE

A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for adhesives, sealants, and caulks.

1.6 SITE CONDITIONS

A. Do not begin installation of interior gypsum board until space is enclosed, space is not exposed to other sources of water, and space is free of standing water.
B. Maintain areas to receive gypsum board at minimum 50-degree F for 48 hours prior to application and continuously after application until drying of joint compound is complete; comply with ASTM C840.

C. Immediately remove from site gypsum board for interior use exposed to water, including gypsum board with water stains, with signs of mold, and gypsum board with mildew.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. National Gypsum Co.

B. Georgia-Pacific Corp.

C. United States Gypsum Co., USG Corp.

D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description: Provide gypsum board assemblies including gypsum board, light gage metal framing, suspension system for gypsum board systems, joint treatment, acoustical accessories, and general accessories.

1. Systems Responsibility: Provide products manufactured by or recommended by manufacturer of gypsum board to maintain single-source responsibility for system.

B. Performance Requirements: Perform gypsum board systems work in accordance with recommendations of ASTM C754 and ASTM C840 unless otherwise specified.

1. Loads: Comply with California Building Code requirements for design of metal framing for gypsum board systems.

   a. Deflection: Maximum L/240 typical, L/360 where tile is indicated.

C. Regulatory Requirements:

1. Seismic Requirements: Comply with code requirements for seismic bracing.

D. Framing: Comply with ASTM C754, 16 gage and lighter unless otherwise indicated; provide gages as recommended by manufacturer for spans and loads indicated and as required by applicable codes.


2. Runners: Match studs.


   a. Sound Rated Assemblies: Provide resilient channels when indicated and where required to provide required sound transmission classifications.

5. Hangers: ASTM A641, Class 1 wire not less than sizes in Table No. 5 of ASTM C754 and as required by applicable codes; hanger rods, flat hangers, and angle-type hangers as required.

6. Suspension System: ASTM C635, suspension system composed of main beams and cross furring members interlocking to form supporting network; recommended by gypsum board system manufacturer.

7. Fasteners and Anchorages: As recommended by gypsum board manufacturer.

E. Gypsum Board: Comply with ASTM C840; maximum permissible lengths; ends square cut, tapered edges on boards to be finished.

1. Typical: ASTM C1396, Type X, fire rated gypsum board, unless otherwise indicated.

2. Mold Resistant Gypsum Board: Provide at high humidity areas not covered with tile including but not limited to restroom, storage, and apparatus bay.
   a. USG Sheetrock Mold Tough Firecode Core
   b. Georgia Pacific/ToughRock Mold-Guard Fireguard X
   c. National Gypsum Gold Bond XP Fire-Shield Gypsum Board
   d. Substitutions: Refer to Section 01 25 00.

   a. Manufacturers:
      1) Georgia Pacific/DensGlass Gold Fireguard Type X
      2) USG/Securock Glass Mat Sheathing Firecode X
      3) National Gypsum/Gold Bond Brand eXP Fire-Shield Sheathing.
      4) Substitutions: Refer to Section 01 25 00.

4. Tile Substrates: Cementitious backer units specified in Section 09 30 00 - Tiling.

F. Gypsum Board Accessories: Comply with ASTM C840.

1. Provide protective coated steel corner beads and edge trim; type designed to be concealed in finished construction by tape and joint compound.

2. Corner Beads: Manufacturer's standard metal beads.


4. Reinforcing Tape, Joint Compound, Adhesive, Water, Fasteners: Types recommended by system manufacturer and conforming to ASTM C475.
   a. Typical Joint Compound: Chemical hardening type for bedding and filling, ready-mixed or powder vinyl type for topping.

5. Control Joints: Back to back casing beads.
   a. Back control joints with 4 mil thick polyethylene air seal.
G. Acoustical Accessories:

1. Acoustical Insulation: Preformed mineral fiber, ASTM C665, Type I; friction fit type without integral vapor barrier; as required to meet STC ratings indicated, or of thickness indicated.

   
   a. Acoustical Sealant Manufacturers:
      1) USG/Sheetrock Acoustical Sealant.
      2) Tremco/Acoustical Sealant.
      3) Pecora/AC-20.
      4) Substitutions: Refer to Division 1.

3. Electrical Box Pads: Provide at outlet, switch, and telephone boxes in walls with acoustical insulation.
   
   a. Electrical Box Pad Manufacturers:
      1) Harry A. Lowry & Associates (800.772.2521)/Lowry's Electrical Box Pads.
      2) Tremco Sheet Caulking (650.572.1656).
      3) Hevi-Duty Nelson (800.331.7325)/Putty Pads.
      4) Specified Technologies, Inc. (800.992.1180)/Putty Pads.
      5) Hilti, Corp./Hilti Box Pads.
      6) Substitutions: Refer to Section 01 25 00.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Metal Framing Erection: Erect metal framing in accordance with ASTM C754 and manufacturer's recommendations.

   1. Install members true to lines and levels to provide surface flatness with maximum variation of 1/8" in 10'-0" in any direction.

   2. Door Opening Framing: Install double studs at door frame jambs; install runners on each side of opening at frame head height between jamb studs and adjacent studs.

   3. Install metal framing backing where required for support of fixtures, cabinets, accessories and hardware.

   4. Coordinate installation of bucks, anchors, blocking, electrical and mechanical work which is to be placed in or behind partition framing; allow items to be installed after framing is complete.
B. Ceiling Framing Installation: Erect in accordance with ASTM C754 and manufacturer's recommendations.

1. Coordinate location of hangers with other work; provide trapeze supports and steel bracing as required to support ceiling.

2. Install ceiling furring independent of walls, columns, and above-ceiling work.

3. Space main carrying channels at maximum 48” on center, not more than 6” from perimeter walls.
   a. Lap splices minimum 12” and secure together 2” from each end of splice.

4. Place furring channels perpendicular to carrying channels at maximum 24” on center and not more than 2” from perimeter walls.

5. Lap splices minimum 8” and secure together 2” from each end of splice.

6. Reinforce openings in ceiling suspension system which interrupt main carrying channels or furring channels, with lateral channel bracing; extend bracing minimum 24” past each end of openings.

7. Laterally brace entire suspension system.

C. Gypsum Board Installation: Install in accordance with ASTM C840 and manufacturer's recommendations.

1. Use screws when fastening gypsum board to furring and to framing.

2. Erect gypsum board with ends and edges occurring over firm bearing.

3. Place control joints to be consistent with lines of building spaces and as directed by Architect.
   a. Provide where system abuts structural elements.
   b. Provide at dissimilar materials.
   c. Lengths exceeding 30’-0” in partitions.
   d. Ceiling areas exceeding 50’-0” or 2500 square feet.
   e. Wings of "L", "U" and "T" shaped ceilings.

4. Place corner beads at external corners; use longest practical lengths.

5. Place edge trim where gypsum board abuts dissimilar materials.

6. Tape, fill, and sand exposed joints, edges, corners, and openings to produce surface ready to receive finishes and feather coats onto adjoining surfaces.

7. Finishing: Comply with Gypsum Association (GA) “Levels of Gypsum Board Finish”.
   a. GA Level 4 (Typical): Provide three-coat finishing and sanding is required for surfaces indicated to be painted; provide flush, smooth joints and surfaces ready for applied paint finishes.

8. Remove and replace defective work.
D. Acoustical Accessories Installation:

1. Place acoustical insulation tight within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

2. Place acoustical sealant within partitions in accordance with manufacturer's recommendations; install acoustical sealant at gypsum board perimeter at:
   a. Metal Framing: One or two beads.
   b. Base layer and face layer.
   c. Penetrations of partitions.

3. Tolerance: Maximum 1/4" space between gypsum board at floor, ceiling, and penetrations and sealed with acoustical sealant.

4. Install electrical box pads with pads molded and pressed on back and all sides of box, closing openings, in accordance with manufacturer's instructions, for complete acoustical barrier.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide thin set floor tile and thin set wall tile over cementitious backer units with accessories, as required for complete installation.
   1. Provide cementitious backer unit tile substrate.
   2. Provide stone thresholds.

B. Related Sections:
   1. Section 09 21 00: Metal framing and gypsum board.

C. Special Coordination for Pre-Engineered Building: Majority of Project consists of pre-engineered building construction with modifications and additions as indicated in Contract Documents.
   1. Coordinate with Section 13 34 00 – Pre-Engineered Building.

1.2 REFERENCES

A. ANSI A108.5: Installation of Tile with Latex-Portland Cement Mortar.
C. ANSI A108.11: Interior Installation of Cementitious Backer Units.

1.3 SUBMITTALS

A. Product Data: Furnish manufacturer's literature for each type of material for Project.
B. Samples: Furnish each type of tile clearly indicating pattern, coloration, and joints.
   1. Color Charts: Submit actual tile sections showing full range of colors, textures, and patterns available for each type of tile.
   2. Prepare two 12” square sample panels of each selected type of tile and grout.

1.4 QUALITY ASSURANCE

A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for adhesives, sealants, and caulks.
1.5 PROJECT CONDITIONS

A. Provide sufficient heat and ventilation in areas where tile work is being performed, to allow tile to properly set.

B. Take precautionary measures necessary to ensure excessive temperature changes do not occur.

PART 2 - PRODUCTS

2.1 MATERIALS

A. System Description: Provide tile installations with tile, grout, setting materials, and accessories as indicated.

B. Regulatory Requirements, Slip-Resistance: Hard surface finishes to comply with requirements of authorities having jurisdiction for slip-resistant hard surfaces, including general code requirements and for access for persons with disabilities.

C. Tile: Types as indicated.

1. Manufacturers:
   b. Dal-Tile Corp.
   c. Crossville Tile.
   d. Summitville Tiles, Inc.
   e. Manufacturers listed on Finish Schedule.
   f. Substitutions: Refer to Section 01 25 00.

2. Color, Style, and Pattern: As indicated on Finish Schedule, as selected by Architect from manufacturer’s full range of types of tiles indicated where not otherwise indicated.
   c. Match Architect approved samples.

3. Base and Trim: Provide matching trim pieces, coordinated with sizes and coursing of adjoining flat tile as directed by Architect; types as indicated, as selected by Architect where not indicated.

D. Latex Thin Set: Thinset bond coat, consisting of latex-cementitious mortar conforming to ANSI A118.4.

1. Manufacturers:
   a. Laticrete International Inc.
   b. Bostik Construction Products/Hydroment.
   c. Custom Building Products.
   d. Mapei Corp.
   e. Parex USA/Mer-Krete.
   f. Substitutions: Refer to Section 01 25 00.
E. Latex-Cement Grout: ANSI A118.7, latex-cementitious type, uniform in color, resistant to shrinkage.

1. Manufacturers:
   a. Laticrete International Inc.
   b. Bostik Construction Products/Hydroment.
   c. Custom Building Products.
   d. Mapei Corp.
   e. Parex USA/Mer-Krete.
   f. Substitutions: Refer to Section 01 25 00.

2. Color: Match tile unless otherwise indicated.

F. Cementitious Backer Units: ANSI A118.9 aggregated Portland cement with woven glass-fiber mesh on both faces; approximately 1/2" thick; UL fire rated as required to maintain integrity of fire rated assemblies.

1. Manufacturers:
   a. USG Industries, Durabond Division/Durock.
   b. National Gypsum Co./PermaBase Cement Board.
   c. Custom Building Products/Wonderboard.
   d. Substitutions: Refer to Section 01 25 00.

2. Contractor Option Coated Glass Mat Backer Units: Georgia Pacific/DenShield, UL fire rated as required to maintain integrity of fire rated assemblies.

G. Stone Thresholds: As indicated on Finish Schedules, minimum ASTM C503, Grade A Carrera White Marble, sides beveled 1:2 slope; color matching Architect approved sample.

1. Total height of threshold shall not exceed tile or adjacent flooring by more than 1/2"; maximum 1/4" vertical lift and maximum 1:2 slope.

H. Cleaning and Sealing Materials: As recommended by tile and grout manufacturers, such as Bostik Construction Products/Hydroment CeramaSeal.

2.2 MIXES

A. Mix and proportion cementitious materials for site-made leveling coats, setting beds and grout as recommended by the TCNA Handbook for Ceramic Tile Installation.

B. Mix and proportion pre-mixed setting beds and grout materials in accordance with manufacturer's recommendations.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prior to installing tile, ensure surfaces are level; comply with TCNA and tile manufacturer recommendations but not greater than following.

1. Thin Set Tile Tolerance: Maximum surface variation of 1/8" in 10'-0".
B. Ensure surfaces are clean and well cured.

C. Do not commence work until surface conditions are within tolerances required for proper installation; apply latex leveling material where necessary to meet required tolerances.

D. Backer Units: Install units in accordance with ANSI A108.11, manufacturer's recommendations, and as required to provide fire ratings indicated on Drawings.

3.2 INSTALLATION

A. Install tile in accordance with referenced ANSI Standards and TCNA recommendations for type of substrate and indicated setting method.

1. Latex-Cement Thin Set Floors over Concrete: TCNA F113.

2. Latex-Cement Thin Set Wall Tile over Cementitious Backer Units: TCNA W244.


B. Place tile in accordance with patterns indicated on Drawings or as directed by Architect; carefully plan tile layouts, ensure pattern is uninterrupted from one surface to the next and through doorways.

1. Apply latex thin set to back of tile where necessary to ensure 100% bond between bond coat and substrate; replace tiles which break due to voids between tile and substrate.

C. Neatly cut tile around fixtures and drains; accurately form corners, base, intersections and returns.

1. Base, Coves: Flush cove type with base grout joint on wall, cove tile on floor, unless otherwise indicated.

2. Corners and Edges: Bullnose tile unless otherwise indicated.

D. Place stone thresholds level and true to line; in correct alignment with tile, doors, and partitions.

E. Locate expansion joints, control joints, contraction joints, and isolation joints where indicated; where not indicated, provide as recommended by TCNA Handbook and as approved by Architect.

F. Ensure tile joints are uniform in width, subject to normal variance in tolerance allowed in tile size; ensure joints are watertight, without voids, cracks, excess mortar, or grout.

G. Sound tile after setting, remove and replace hollow sounding units.

H. Allow tile to set for a minimum 48 hours prior to grouting.

I. Grout tile to comply with recommendations of TCNA and as specified.

J. Leave completed installation free of broken, damaged, and faulty tile.
3.2 CLEANING AND SEALING

A. Clean tile surfaces free of foreign matter upon completion of grouting.

B. Seal tile and grout surfaces where recommended by manufacturer for materials and applications involved; comply with manufacturer’s recommendations.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide painting and finishing of exposed items and surfaces requiring field painting and finishing including shop primed items.

1. Specified surface preparation, priming and coats of paint are in addition to shop-priming and surface treatment specified under other sections of work.

2. Painting and finishing include field finishing of exterior and interior items not listed as "Surfaces not to be Painted" unless clearly indicated otherwise.

3. Painting and finishing include field finishing of select shop finished items where indicated as required to match adjacent surfaces, such as mechanical grilles and registers.

4. Field paint exposed bare and covered pipes, ducts, and hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under mechanical and electrical work in occupied spaces.

B. Surfaces Not to be Painted:

1. Finished items including finished metal surfaces.
2. Walls and ceilings in concealed areas and generally inaccessible areas.
3. Moving parts of operating mechanical and electrical units.
4. Labels: Keep equipment identification and fire rating labels free of paint.
5. Plastic smoke stops and weather-stripping at doors.

C. Related Sections: Shop priming of ferrous metal items is included under various Specification sections.

1. Section 09 96 70: High performance coating for exterior metal fabrications.

D. Special Coordination for Pre-Engineered Building: Majority of Project consists of pre-engineered building construction with modifications and additions as indicated in Contract Documents.

1. Coordinate with Section 13 34 00 – Pre-Engineered Building.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's technical information, including paint label analysis and application instructions for each material.
B. Samples: Submit samples for review of color and texture; provide list of material and application for each coat of each finish sample.

   1. Brush-Outs: Submit samples of each color and material with texture to simulate actual conditions, on hardboard.

   2. Field Samples: Duplicate painted finishes of approved samples on actual wall surfaces and components for approval prior to commencing work.

      a. Size: Minimum 4-sf located where approved.
      b. Components: One full component as directed.
      c. Simulate finished lighting conditions for review.

C. Manufacturer Certificates: Furnish certificates from each manufacturer stating materials are top quality lines and suitable for intended use on this Project.

1.3 QUALITY ASSURANCE

A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for paints and coatings.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to job site in original, new, and unopened packages and containers bearing manufacturer's name and label, with:

   1. Name of material, color and sheen.
   2. Manufacturer's name, stock number and date of manufacture.
   3. Contents by volume, for major pigment and vehicle constituents.
   4. Thinning and application instructions.

1.5 SITE CONDITIONS

A. Apply water-base paints when temperature of surfaces and surrounding air are between 50 and 90-degrees F.

B. Do not apply paint in rain, fog, or mist; or when relative humidity exceeds 85 percent; or to damp or wet surfaces.

C. Painting may be continued during inclement weather if areas to be painted are enclosed and heated within temperature limits specified.

D. Provide additional temporary ventilation during interior application of paints to eliminate volatile organic compound (VOC) emissions from interior spaces as quickly as possible.
PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. Benjamin Moore & Co.
B. Sherwin-Williams Co.
C. Pittsburgh Paints, PPG Pittsburgh Paints.
D. Dunn-Edwards Corp.
E. Glidden Professional Division Akzo Nobel Paints including Devoe.
F. Kelly Moore Paint Co.
G. Vista Paint Co.
H. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description: Provide painting and finishing of exposed items and surfaces requiring field painting and finishing including shop primed items.

1. Definition: "Painting" and "coating" as used herein means systems including primers, emulsions, enamels, stains, sealers, and fillers, whether used as prime, intermediate or finish coats.

B. Regulatory Requirements, Volatile Organic Compound (VOC) Emissions: Furnish materials approved for use by applicable air quality management district for limitations of volatile organic compounds for architectural or special coatings as applicable.

C. Material Quality: Provide top line quality commercial grade (professional painter) paints; materials not bearing manufacturer's identification as their top line product shall not be acceptable.

1. Primers: Provide premium grade primers recommended by paint manufacturer for substrates indicated and for finish systems specified.
2. Undercoats and Barrier Coats: Provide undercoat paints produced by same manufacturer as finish coats; use only thinners approved by paint manufacturer and use only within recommended limits.
3. Finish Coats: Provide finish coats capable of being washed with mild detergent without loss of color, sheen, or pigments.
   a. Color pigments: Pure, non-fading, applicable types to suit substrates and service indicated; no lead content permitted.
4. Finish Coat Coordination: Provide finish coats which are compatible with prime paints, undercoats, and barrier coats used.
   a. Review other Specification sections in which prime paints are provided; ensure compatibility of total coatings systems.
   b. Upon request from other trades furnish information on characteristics of finish materials proposed for use.
   c. Provide barrier coats over incompatible primers or remove and prime as required.
   d. Notify Architect in writing of any anticipated problems in use of specified coating systems with substrates primed by others.

D. Colors and Finishes: Prior to commencement of painting work, Architect will furnish color chips for surfaces to be painted.
   1. Use of proprietary names in color selection is not intended to imply exclusion of equivalent products of other manufacturers.
   2. Final acceptance of colors will be from samples applied on site.
   3. Colors: As indicated on Finish Schedules, as directed by Architect where not otherwise indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. Inspection: Examine areas and conditions under which painting work is to be applied.
   1. Start of painting work indicates acceptance of surfaces and conditions of surfaces and conditions within any area.
   2. Where exposed items or surfaces are not specifically mentioned in Schedules, paint same as adjacent similar materials or areas.
   3. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to a durable paint film.

B. Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as specified for substrate condition.

C. Remove hardware, accessories, and items in place and not to be painted, or provide protection prior to surface preparation and painting; after painting reinstall removed items.

D. Clean surfaces before applying paint; remove oil and grease prior to mechanical cleaning; program cleaning so contaminants from cleaning process do not fall onto wet, newly painted surfaces.
E. Ferrous Metals: Touch up shop-applied prime coats wherever damaged using same type of primer as applied in shop or barrier coat compatible with finish paint.

1. Bare Surfaces: Clean surfaces that are not galvanized or shop-coated, of oil, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.

2. Galvanized Surfaces: Clean free of oil and surface contaminants, using non-petroleum-based solvent; primer and touch-up primer to be zinc-rich primer.

F. Mix painting materials in accordance with manufacturer's directions.

G. Store materials in tightly covered containers; maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.

H. Stir materials before application to produce mixture of uniform density and stir as required during application; do not stir surface film into material, if necessary, strain material before using.

3.2 APPLICATION

A. Apply paint in accordance with manufacturer's directions; use applicators and techniques best suited for substrate and type of material being applied.

1. Apply additional coats when stains or blemishes show through final coat, until paint is a uniform finish, color, and appearance.

2. Provide extra attention during application to assure dry film thickness at corners and crevices is equivalent to that of flat surfaces.

3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces; paint surfaces behind permanently fixed equipment and furniture with prime coat only.

4. Finish doors on tops, bottoms, and side edges same as faces.

5. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.

6. Sand lightly between coats when recommended by system manufacturer.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or prepared for painting as soon as practicable after preparation.

1. Allow time between successive coatings to permit proper drying.

2. Do not recoat until paint feels firm and does not deform or feel sticky under moderate thumb pressure.

C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as recommended by coating manufacturer.
D. Prime Coats: Apply to items not previously primed; recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat.

E. Finish Coats: Provide even texture; leave no laps, irregularity in texture, skid marks, or other surface imperfections.
   1. Opaque Finishes: Provide opaque, uniform finish, color, and coverage; cloudiness, spotting, holidays, brush marks, runs, sags, ropiness, and other surface imperfections are not acceptable.

F. Completed Work: Match approved samples for color, texture, and coverage; remove, refinish, or repaint work not accepted.

3.3 PAINTING SCHEDULE

A. Exterior Work: Provide following paint systems.
   1. Metal (Not Shop Finished, Pre-Engineered Building): Refer to Section 09 96 70: Semigloss sheen.
      a. 1st Coat: Touch-up primer, prime if none.
      b. 2nd and 3rd Coat: Exterior 100% acrylic enamel.
   2. Traffic Line Paint: Manufacturer’s standard sheen; colors as required by line or symbol; blue for handicapped parking spaces.
      a. 1st and 2nd Coat: Water based acrylic/epoxy traffic line paint; other systems subject to prior approval by Architect.

B. Interior Work: Provide following paint systems.
   1. Gypsum Board Systems: Eggshell (satin) sheen at walls, flat sheen at ceilings, semigloss sheen at restroom.
      a. 1st Coat: Universal primer.
      b. 2nd and 3rd Coat: Interior latex or acrylic latex emulsion.
      a. 1st Coat: Touch-up primer, prime if none.
      b. 2nd and 3rd Coat: 100% acrylic enamel.
   3. Concrete: Semigloss sheen.
      a. 1st Coat: Primer sealer.
      b. 2nd and 3rd Coat: Exterior latex enamel.

B. Sheens: Comply with ASTM D523, reflectance of paint.
   1. Flat: 1-10.
   3. Eggshell: 30-45.
   4. Semigloss: 45-75.
   5. Gloss: 75-100.
3.4 CLEAN-UP, PROTECTION, AND REPAIR

A. Clean-Up: During progress of work, remove discarded paint materials, rubbish, cans, and rags from site at end of each workday.

1. Clean glass and paint-spattered surfaces immediately by proper methods of washing and scraping, using care not to scratch or damage finished surfaces.

B. Protection: Protect work of other trades, whether to be painted or not; correct damage by cleaning, repairing, or replacing, and repainting, as acceptable to Architect.

1. Provide "Wet Paint" signs to protect newly painted finishes.

2. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.

C. Repair: At completion of work of other trades, touch-up and restore damaged surfaces or defaced painted surfaces.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide high-performance coating system of urethane over epoxy primer as indicated, including surface preparation, priming and high-performance coating application.

1. Location: Provide high-performance coating at exterior steel not part of pre-engineered building. Coordinate priming with exterior steel specifications.

B. Related Work:

1. Section 09 90 00: Standard painting and coating systems.

1.2 SUBMITTALS

A. Product Data: Manufacturer’s technical information, including coating label analysis and application instructions for each material.

B. Samples: Submit samples for review of color and texture; provide list of material and application for each coat of each finish sample.

1. Provide samples of each color and material with texture to simulate actual conditions.

C. Certificates: Provide certificate from each manufacturer stating material is top quality line and suitable for intended use on this Project.

1.3 QUALITY ASSURANCE

A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for paints and coatings.

B. Installer Qualifications: Minimum of five years successful experience in application of high-performance coating systems of type specified and acceptable to manufacturer of coating system.

C. Mock-Up: Duplicate finish of approved samples in field at location as approved by Architect, one complete component.

1. Approved mock-up may be incorporated into Project.
1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to job site in original, new, and unopened packages and containers bearing manufacturer's name and label, with:

1. Name of material, color, and sheen.
2. Manufacturer's name, stock number and date of manufacture.
3. Contents by volume, for major pigment and vehicle constituents.
4. Thinning and application instructions.

1.5 SITE CONDITIONS

A. Apply high performance coating when temperature of surfaces and surrounding air are between manufacturer recommended temperatures.

B. Do not apply high performance coating in rain, fog, or mist; or when relative humidity exceeds 85-percent; or to damp or wet surfaces.

1.6 WARRANTY

A. Extended Correction Period: Provide for correcting failure of high-performance coating including peeling, chipping, rusting of substrate, cracking, delamination, chalking, and loss of color and sheen.

1. Period: Two years.

B. Manufacturer's Warranty: Submit manufacturer’s warranty including special manufacturer services as required for manufacturer’s warranty.

1. Period: 10 years.

2. Manufacturer's warranty shall not detract from requirements of extended correction period nor from Owner’s rights under implied and expressed warranties regardless of wording of manufacturer’s warranty.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. DuPont Co. Maintenance Finishes.

B. Tnemec Company, Inc.

C. PPG Protective & Marine Coatings.

D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description: Provide high performance coating system of urethane over epoxy primer as indicated, including surface preparation, priming and high-performance coating application.

C. Special Coating: High build acrylic polyurethane or aliphatic polyurethane over compatible epoxy primer as recommended by coating manufacturer and suitable for applications indicated and based on quality of following products.

1. Systems:
   b. Tnemec/Endura-Shield II (Series 1075) with Series V69 epoxy primer.
   c. PPG/AmerShield VOC with Amerlock 2-400 primer.
   d. Substitutions: Refer to Section 01 25 00.

2. Special Coating System: Provide specific primer and coating as recommended by manufacturer for applications indicated, conforming to specified requirements.
   a. 1st Coat: Epoxy primer.
   b. 2nd and 3rd Coat: High-build acrylic polyurethane or high-build polyurethane.

3. System Requirements:
   a. Abrasion: ASTM D4060, CS-17 Wheel, 1,000 grams load, no more than 95 mg. loss after 1000 cycles.
   b. Adhesion: ASTM D3359 Method B (Crosshatch Adhesion), coating applied to sandblasted steel and cured 30 days at 77° F, minimum rating of 5 on average of three tests.
   c. Humidity: ASTM D4585, no blistering, cracking, or delamination of film after 1000 hours exposure.
   d. Salt Spray (Fog): ASTM B117, no blistering, rusting, cracking, or delamination of film; maximum 1/8" rust creepage at scribe after 1000 hours exposure.
   e. UV: ASTM G154, no blistering, cracking, or chalking, less than 35% gloss loss and less than 3.5 MacAdam unit color change after 1500 hours exposure.

4. Coordination: Provide special coating system compatible with prime paints, undercoats, and barrier coats used.
   a. Review other Specification sections in which prime paints and zinc-rich touch-coatings up are provided; ensure compatibility of total coatings systems.
   b. Upon request from other trades furnish information on characteristics of finish materials proposed for use.
   c. Provide barrier coats over incompatible primers or remove and reprime as required. Reprime with zinc-rich primer where galvanized.
   d. Notify Architect in writing of any anticipated problems in use of specified coating systems with substrates primed by others.
D. Colors and Finishes:

1. Prior to commencement of coating work, Architect will furnish color chips for surfaces to be coated; custom colors may be required.

2. Final acceptance of colors will be from samples applied on site.

3. Color pigments: Pure, non-fading, applicable types to suit substrates and service indicated; no lead content permitted.

4. Sheen: Gloss; comply with ASTM D523, reflectance of coating, 75-100.

E. Material Quality: Provide primers produced by same manufacturer as finish coats; use only thinners approved by coating manufacturer and use only within recommended limits.

PART 3 - EXECUTION

3.1 PREPARATION

A. Inspection: Examine areas and conditions under which high performance coating work is to be applied.

1. Start of high-performance coating work indicates acceptance of surfaces and conditions of surfaces and conditions within any area.

2. Do not apply coating over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to a durable coating.

B. Perform preparation and cleaning procedures in accordance with coating manufacturer's instructions and as specified for substrate condition.

C. Remove items in place and not to be coated or provide protection prior to application of high-performance coating; after application of coating reinstall removed items.

D. Clean surfaces before applying high-performance coating; remove oil and grease prior to mechanical cleaning; program cleaning so contaminants from cleaning process do not fall onto wet, newly coated surfaces.

E. Metal Preparation: Comply with coating manufacturer recommendations, but not less than following requirements.

1. Bare Surfaces: Clean surfaces which are not galvanized or shop-coated, of oil, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.

2. Galvanized Surfaces: Clean free of oil and surface contaminants, using non-petroleum-based solvent.

3. Painted Surfaces: Clean surfaces of loose paint, dirt, and foreign substances by mechanical cleaning; feather edges of existing paint to provide smooth, even substrate for high performance coating.

F. Mix materials in accordance with manufacturer's directions.
G. Store materials in tightly covered containers; maintain containers used in storage, mixing and application of coating in a clean condition, free of foreign materials and residue.

H. Stir materials before application to produce mixture of uniform density and stir as required during application; do not stir surface film into material, if necessary, strain material before using.

3.2 APPLICATION

A. Apply high performance coating in accordance with manufacturer's directions; use applicators and techniques best suited for substrate and coating material being applied.

1. Apply additional coats when stains or blemishes show through final coat, until coating is a uniform finish, color and appearance.

2. Provide extra attention to assure dry film thickness at corners and crevices is equivalent to that of flat surfaces.

B. Scheduling: Apply first coat to surfaces that have been cleaned, pretreated, or prepared for high performance coating as soon as practicable after preparation.

1. Allow time between successive coatings to permit proper drying.

2. Do not recoat until coating feels firm and does not deform or feel sticky under moderate thumb pressure.

C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as recommended by coating manufacturer.

D. Prime Coats: Apply to items not previously primed; recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat.

E. Finish Coats: Provide even texture; leave no laps, irregularity in texture, skid marks, or other surface imperfections; edges clean and sharp where work joins other materials and colors.

1. Provide opaque, uniform finish, color, and coverage; cloudiness, spotting, holidays, brush marks, runs, sags, ropiness, and other surface imperfections are not acceptable.

F. Completed Work: Match approved samples and mock-up for color, texture, and coverage. Remove, refinish, or recoat work not accepted.

3.3 CLEAN-UP, PROTECTION AND REPAIR

A. Clean-Up: During progress of work, remove discarded coating materials, rubbish, cans and rags from site at end of each workday.

1. Clean glass and coating-spattered surfaces immediately by proper methods of washing and scraping, using care not to scratch or damage finished surfaces.
B. Protection: Protect work of other trades, whether to be coated or not; correct damage by cleaning, repairing or replacing, and refinishing, as acceptable to Architect.

1. Provide “Wet Coating” or “Wet Paint” signs to protect newly coated surfaces.

2. Remove temporary protective wrappings provided by others for protection of their work, after completion of coating operations.

C. Repair: At completion of work of other trades, touch-up and restore damaged surfaces and defaced coated surfaces.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide general signage as indicated complete with attachment devices and accessories as required for complete installation.

B. Alternates: Refer to Section 01 15 00 – Measurement and Payment with Alternates.

C. Related Sections:
   1. Section 09 90 00: Traffic line paint.
   2. Division 26: Photoluminescent exit signs.

1.2 SUBMITTALS

A. Product Data: Furnish manufacturer’s literature and indicate each sign type, style, color, and method of attachment.

B. Shop Drawings: Furnish listing of sign types, lettering, and locations, along with dimensions of each sign.
   1. Computerized Output: Furnish computerized samples of signs and graphics at full scale duplicating final appearance.

C. Certification: Furnish manufacturer certification that photoluminescent egress path markings and signage conform to California Building Code requirements.

1.3 QUALITY ASSURANCE

A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for adhesives.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Package separately or in like groups of names, labeled as to names enclosed; include installation template, attachment system and installation instructions.
PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. ASI Modulex, ASI Sign Systems, Inc.

B. Mohawk Sign Systems.

C. Vomar Products, Inc.

D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description: Provide signage as indicated with attachment devices and accessories.

B. Regulatory Requirements: Provide signs for assuring access for persons with disabilities in accordance with state and federal regulations.


2. Federal Regulations: Comply with Americans with Disabilities Act (ADA) Standards.

C. Monument and Dimensional Letter Signage: Provide individual letter signs as indicated.

1. Aluminum: Manufacturer’s standard for individual letter signs.

2. Fabrication: Fabricate dimensional letters as indicated, of minimum 0.25” plate or casting with edges and corners smooth and finished to match adjacent metal finishes.

3. Attachment: Secure letters using connections concealed after installation; method subject to Architect approval.
   a. Take care back welding does not damage exposed sign surfaces.

D. Toilet Room Door Signs: Provide door signs conforming to California requirements for signs for toilet rooms; concealed mounting system.

1. Material, Plastic: Manufacturer’s standard colored plastic/photopolymer signs; color as indicated, as selected by Architect from manufacturer’s full range of colors where not otherwise indicated.
   a. Texture: Smooth.

2. Total Thickness: 0.25”.
3. Provide signs required by California Code of Regulations Title 24.
   a. Gender Neutral Room: 12” diameter circle with equilateral triangle, vertex pointing up, superimposed on the circle; circle and triangle each 0.25” thick.
      1) Color of triangle shall contrast with color of circle which shall contrast with color of door face.

4. Colors: As selected to contrast with doors.

5. Symbols: As selected from manufacturer’s standard symbols.

6. Adhesive: Type as recommended by sign manufacturer for type of substrate involved.

E. Toilet Room Wall Signs: Provide signs conforming to California Building Code and ADA Standards for signs for permanent rooms, with inset symbols and with raised and Braille characters; concealed mounting system.

   1. Material, Plastic: Manufacturer’s standard colored plastic/photopolymer signs; color as indicated, as selected by Architect from manufacturer’s full range of colors where not otherwise indicated.
      a. Texture: Smooth.

F. Parking Signs: Provide aluminum signs with vinyl reflective coating and with text and symbols meeting requirements of California Building Standards Code and with ADA Standards.

   1. At entry to parking provide state required sign indicating unauthorized vehicles parking in accessible parking spaces may be towed at owner’s expense using exact wording required by CBC.

   2. Verify location and telephone number of location vehicle is to be towed with Owner; place this information as permanent part of sign wording.

   3. At parking spaces provide California required reflectorized sign, minimum 70 sq. inches, with symbol indicating accessibility.

   4. At van accessible parking spaces provide required “VAN PARKING” signs.

   5. Mounting: Wall mount or provide 3” diameter galvanized Schedule 40 steel post set in 12” diameter by 36” deep concrete footing unless otherwise indicated.

B. Tactile Exit Door Signs: Provide colored plastic/photopolymer signs, conforming to California Building Code Section 1013.4 and ADA Standards for signs for permanent rooms, with tactile raised and Braille characters; concealed mounting system.

   1. Colors: As selected by Architect.

   2. Size and Style: As indicated on Drawings.
2.2 FABRICATION

A. Signs and Graphics:

1. Character Type: Characters on signs shall be raised 1/32" and shall be sans serif uppercase case characters accompanied by Grade 2 Braille.

2. Character Size: Raised characters shall be minimum 5/8" and maximum 2".

3. Finish and Contrast: Contrast between character, symbols and their background shall be 70% minimum and have non-glare finish. See California Building Code Section 11B-703.5.1

4. Grade 2 Braille: California(contractured) Grade 2 Braille shall be used wherever Braille is required.
   a. Dots shall be 1/10" on centers with 2/10" space between cells, measured from second column of dots in first cell to first column of dots in second cell.
   b. Dots shall be raised minimum 1/.40” above background.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install signs in accordance with manufacturer recommendations and installation instructions, free from distortions and defects.

B. Monument and Dimensional Letter Signage: Locate dimensional letters with spacing based on full-size computer-generated installation drawings secured to structure as required to resist anticipated loads.

   1. Final Location: As approved in field by Architect based on full size drawings.

C. Toilet Room Door Signs: Install signs on doors after doors are painted and finished.

   1. Location: Mount signs with centerline of sign between 58" and 60" height as required by applicable code.

   2. Install centered and level, in line, in accordance with the manufacturer’s recommendations.

   3. Clean and polish, remove excess adhesive.

D. Toilet Room Wall Signs: Install signs on walls after surfaces on which they are to be mounted are painted and finished.

   1. Location: Mount signs at 48" to 60" height as required by applicable codes on strike side of door.

   2. Install level, in line, in accordance with California Building Code and ADA Standards to allow a person to approach within 3” of signs without being within a door swing and without encountering protruding objects.

   3. Clean and polish, remove excess adhesive.
E. Tactile Exit Door Signs: Install at doors with lighted “EXIT” signs; apply after walls are finished.

1. Location: Mount signs at 48" to 60" height as required by applicable codes on strike side of door.

2. Install level, in line, in accordance with the manufacturer's recommendations and ADA Standards to allow a person to approach within 3" of signs without being within a door swing and without encountering protruding objects.

3. Clean and polish, remove excess adhesive.

END OF SECTION
SECTION 10 28 00
TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY
   A. Section Includes: Provide toilet accessories with attachment hardware and rough-in frames as required for complete, operational installation.

1.2 SUBMITTALS
   A. Product Data: Submit manufacturer's product data illustrating each accessory at large scale.

1.3 QUALITY ASSURANCE
   A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for adhesives.

1.4 DELIVERY, STORAGE AND HANDLING
   A. Deliver inserts and rough-in frames to jobsite at appropriate time for building in.
   B. Do not deliver accessories to site until rooms in which they are to be installed are ready to receive them.
   C. Pack accessories individually, protect each item and its finish.

1.5 SITE CONDITIONS
   A. Protect adjacent or adjoining finished surfaces from damage during installation of work of this section.
   B. Before starting work notify Architect in writing of conditions detrimental to installation or operation of units.
   C. Verify with Architect exact location of accessories.

1.6 WARRANTY
   A. Extended Correction Period:
      1. Replace mirrors which exhibit signs of desilvering or distortion.
      2. Period: Two years.
PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. Bobrick Washroom Equipment, Inc.
B. Bradley Corporation.
C. American Specialties, Inc.
D. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS

A. System Description: Provide toilet accessories with attachment hardware and rough-in frames.
   1. Provide standard materials and finishes for accessories listed; where more than one material or finish is available and not otherwise indicated provide as selected by Architect from manufacturer’s standard materials and finishes.


C. Stainless Steel Sheet: ASTM A666, commercial grade, Type 304, gages as standard with manufacturer of specified items.

D. Stainless Steel Tubing: ASTM A269, commercial grade, seamless welded.

E. Mirror Glass: ASTM C1036, q1 mirror select clear float glass with full silver coating, copper coating and organic coating; minimum 1/4" thick.

F. Sheet Steel: ASTM A1008, cold rolled stretcher leveled; minimum G90 galvanized coating, ASTM A924 and A653.

G. Adhesive: Epoxy type contact cement as recommended by accessory manufacturer.

H. Fasteners, Screws, and Bolts: Hot-dipped galvanized; as recommended by accessory manufacturer for component and substrate.

2.3 FABRICATION

A. Weld and grind smooth joints of fabricated components.

B. Form exposed surfaces from one sheet of stock, free of joints.

C. Fabricate units with tight seams and joints, exposed edges rolled; hang doors and access panels with continuous piano hinges; provide concealed anchorage where possible.

D. Provide steel anchor plates and anchor components for installation on building finishes.
E. Form surfaces flat without distortion; maintain flat surfaces without scratches and without dents; finish exposed edges eased, free of sharp edges where potential exists for physical contact.

F. Back paint components where contact is made with building finishes, to prevent electrolysis.

G. Hot-dipped galvanize ferrous metal anchors and fastening devices.

H. Assemble components in shop; package complete with anchors and fittings.

2.4 FINISHES

A. Exposed Finishes: Stainless steel, number 4, satin finish; satin chrome finish acceptable where stainless steel not available for accessory item listed or scheduled.

B. Concealed Surfaces: Treat and clean, spray-apply one coat primer and baked enamel finish.

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide templates and rough-in measurements.

3.2 INSTALLATION

A. Install accessories in accordance with manufacturer’s printed instructions using fasteners appropriate to substrate.

B. Install true, plumb, and level, securely and rigidly anchored to substrate.

C. Use tamper-proof, security type fasteners.

D. Adjust accessories for proper operation and verify mechanisms function smoothly.

E. Replace damaged and defective items.

F. Clean and polish exposed surfaces after removing temporary labels.

3.3 TOILET ACCESSORIES SCHEDULE

A. Refer to Drawings.

END OF SECTION
SECTION 10 75 00
METAL FLAGPOLES (ALTERNATE)

PART 1 - GENERAL

1.1 SUMMARY
   A. Section Includes: Provide embedded ground set cone tapered aluminum flagpoles with concealed halyard system, revolving truck, pulleys and fittings, and accessories as required for complete finished installation.
   B. Alternates: Refer to Section 01 15 00 – Measurement and Payment with Alternates.

1.2 REFERENCES

1.3 SUBMITTALS
   A. Product Data: Submit manufacturer’s literature.
   B. Shop Drawings: Indicate dimensions of pole, anchor requirements, all components, and sizes.
   C. Samples: Submit pole finish, indicating polish, texture, and color.

1.4 DELIVERY, STORAGE, AND HANDLING
   A. Spiral wrap flagpole with protective covering and pack in shipping tubes.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS
   A. Morgan Francis Flagpoles and Accessories.
   B. American Flagpole, Division of Kearney-National Inc.
   C. Concord Industries, Inc.
   D. John Ewing & Co. Inc.
   E. Substitutions: Refer to Section 01 25 00.

2.2 MATERIALS
   A. System Description: Provide embedded ground set cone tapered aluminum flagpoles with concealed halyard system, revolving truck, pulleys and fittings, and accessories.
B. Performance Criteria: Flagpole system shall resist 90 mph wind velocity without permanent deformation, and non-resonant.

C. Flagpoles: One-piece, cone tapered aluminum poles; conforming to NAAMM Metal Flagpole Manual.
   1. Type: Embedded ground mounted type (minimum 4'-0" setting depth).
   2. Nominal Height: 25'-0".
   3. Outside Diameter: Nominal 7" at butt, nominal 3" at top.
   4. Wall Thickness: Minimum 0.188".

D. Aluminum: ASTM B221.
   1. Finish: Manufacturer's standard clear satin anodized aluminum.

E. Foundation Base: Embedded type concrete construction.

B. Flash Collar/Base: As indicated; where not specifically indicated, as selected by Architect from manufacturer's standard flash collars and ornamental bases.

F. Internal Halyard System: Manufacturer's standard stainless-steel aircraft cable system, revolving truck with stainless steel ball-bearings, non-fouling, heavy duty winch with locked flush access door.
   1. Provide bronze snap hooks.
   2. Provide rubber covered counterweight.
   3. Provide braided sling.
   4. Provide two removable crank handles.

G. Lightning Ground Rod: Minimum 10" long copper rod, 3/4" diameter.

H. Lightning Ground Cable: Copper No. 6 AWG stranded, soft drawn.

I. Asphaltic Paint: Bituminous coating, black color.

**PART 3 - EXECUTION**

3.1 PREPARATION

A. Install concrete foundations for flagpoles correctly sized and positioned.

B. Coat portions of flagpole below grade and in contact with dissimilar materials with asphaltic paint.

3.2 INSTALLATION

A. Install flagpole, base assembly, and fittings in accordance with manufacturer’s recommendations and installation instructions and as indicated on drawings.
B. Ground flagpole installations.

C. Check and adjust installed fittings for smooth operation.

D. Instruct Owner's representative in maintenance and operation.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide pre-engineered metal building systems with accessories and components as required for complete structure conforming to applicable codes and architectural design and configuration indicated on Drawings.

1. Pre-engineered building systems include structural framing, shop finished roofing, shop finished siding, roof and wall insulation, metal flashings, trim, gutters, downspouts, and diagonal bracing.
   a. Structural framing includes columns, rafters, struts, purlins, and girts.

2. Provide insulated sectional doors with electric operators.

3. Provide louvers.

4. Provide joint sealants, accessories, components, and materials as required for complete metal building systems.

B. Alternates: Refer to Section 01 15 00 – Measurement and Payments with Alternates.

C. Related Sections:

1. Division 03: Concrete floor and foundations and installation of anchor bolts.

2. Division 07: Thermal and moisture protection including joint sealants not included with pre-engineered building system.

3. Division 08: Openings (exterior & interior doors and door hardware).

4. Division 09: Finishes other than shop finished pre-engineered metal building components.

D. Special Coordination for Pre-Engineered Building: Majority of Project consists of pre-engineered building construction with modifications and additions as indicated in Contract Documents.

1. Coordinate with other technical specifications section to ensure modifications and additions are properly incorporated into pre-engineered building.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Design/Build: Provide special engineering for pre-engineered structures to ensure compliance with applicable codes and Contract Documents.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer’s product information, test data, specifications, and installation instructions for building components and accessories.
B. Shop Drawings: Submit complete erection drawings showing anchor bolts settings, sidewall, end wall, and roof framing, transverse cross sections, covering and trim details, and accessory installation details.
   1. Clearly indicate assembly of building components.
   2. Submit calculations and drawings including reactions to foundations and anchor bolt plans.

C. Samples: Submit samples of the following. Architect's review will be for color and texture only; compliance with other requirements is responsibility of Contractor.
   1. Submit roofing and siding panels, with required finishes.
   2. Submit fasteners for application of roofing and siding panels.
   3. Submit exposed sealants and closures.

D. Certificates:
   1. Submit written certification prepared and signed by professional engineer, registered to practice in California verifying building design meets indicated loading requirements and applicable codes and regulations.
   2. Submit proof of manufacturer’s AISC category MB certification.

E. Design/Build Certificates: Submit certification signed by California licensed structural engineer indicating compliance with Contract Documents and code requirements.

1.4 QUALITY ASSURANCE

A. Qualification of Manufacturers: Provide pre-engineered metal buildings as produced by a manufacturer with not less than 5 years successful experience in fabrication of pre-engineered metal buildings of type and quality required.
   1. Manufacturer to be certified in accordance with American Institute of Steel Construction (AISC) quality certification program category MB for metal buildings.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store components, sheets, panels, and other manufactured items so they will not be damaged or deformed.
B. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weathertight ventilated covering.
C. Store metal sheets or panels so water accumulations will drain freely.
D. Do not store sheets or panels in contact with other materials that might cause staining.

PART 2 - PRODUCTS

2.1 SYSTEMS MANUFACTURERS

A. CBC Steel Buildings, a NUCOR Company.
B. Butler Manufacturing Co.
C. Star Building Systems, Oklahoma City, Oklahoma.
D. Substitutions: Refer to Section 01 25 00.
2.2 MATERIALS

A. System Description: Provide pre-engineered metal building systems with accessories and components.

B. Performance Criteria: Building is to be built to Essential Service Facility standards and an Occupancy IV Building in accordance with California Building Standards Code, Title 24.

1. Design Requirements: Provide configuration as indicated on Drawings.
   a. Structural Framing: Design primary and secondary structural members and exterior covering materials for applicable loads and combinations of loads in accordance with the Metal Building Manufacturer's Association (MBMA) "Design Practices Manual."
   b. Structural Steel: Comply with American Institute of Steel Construction's (AISC) "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" for design requirements and allowable stresses.
   c. Light Gage Steel: Comply with American Iron and Steel Institute's (AISI) "Specification for the Design of Cold Formed Steel Structural Members" and "Design of Light Gage Steel Diaphragms" for design and allowable stresses.

2. Design Loads: Basic design loads, as well as auxiliary and collateral loads, shall conform to applicable code requirements.
   a. Determine design loads based on applicable codes, including dead load, live load, wind load and seismic load.
      1) Seismic Importance Factor: 1.5.
      2) Basic Wind Speed: 115 MPH.
   b. Collateral loads include additional dead loads over and above weight of metal building system such as sprinkler systems and mechanical systems.
      1) Minimum Collateral Load: 8 psf.
   c. Review Contract Drawings and include concentrated loads from miscellaneous equipment and suspended ceilings.
   d. Design each member to withstand stresses resulting from combinations of loads that produce maximum allowable stresses in that member as prescribed in MBMA's "Design Practices Manual."

3. Maximum Allowable Deflections: Maximum L/240 unless otherwise indicated.
   a. Frame Sidesway: Comply with applicable code requirements.

4. Load Combinations: Comply with building code requirements with minimum load combinations.
C. Regulatory Requirements: Comply with California Building Standards Code, Title 24, for building structural design and other applicable code requirements based on work included under this section.

D. Hot-Rolled Structural Shapes: Comply with requirements of ASTM A36 or A529.

E. Tubing or Pipe: Comply with requirements of ASTM A500, Grade B, A501, or A53.

F. Members Fabricated from Plate or Bar Stock: Provide minimum ASTM A36, 36,000 psi minimum yield strength.

G. Members Fabricated by Cold Forming: Provide minimum 33 KSI or 50 KSI as applicable depending on gage of metal required.

H. Galvanized Steel Sheet: Comply with requirements of ASTM A446 with G90 coating. "Class" to suit building manufacturer’s standards.

I. Shop Primer for Ferrous Metal: Provide manufacturer’s standard, fast-curing lead-free, "universal" primer, selected for resistance to normal atmospheric corrosion and for compatibility with finish paint systems indicated.

J. Shop Primer for Galvanized Members: Provide manufacturer’s standard zinc rich primer selected for compatibility with substrate.

2.3 FABRICATION

A. Design shop fabricated components and necessary field connections required for erection to permit easy assembly.

B. Clearly and legibly mark each piece and part of assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.

C. Structural Framing Components: As indicated on Drawings.

1. Provide frames factory welded and shop painted. Furnish frames complete with attachment plates, bearing plates and splice members. Factory drill frames for bolted field assembly.

   a. Provide length of span and spacing of frames as indicated. Slight variations in length of span and frame spacing may be acceptable if necessary, to meet manufacturer’s standard.

   b. Provide rigid frames at endwalls where indicated.

2. Secondary Framing: Provide not less than 16 gage shop painted rolled formed sections secondary framing members.

3. Bolts: Comply with requirements of ASTM A325 for design loads and connection details.

   a. Provide shop painted bolts; when units are in direct contact with panels, provide zinc-plated or cadmium-plated bolts.
4. Fabrication: Shop fabricate structural framing components to indicated size and section complete with base plates, bearing plates and other plates required for erection, welded in place.
   a. Provide required holes for anchoring or for connections either shop drilled or punched to template dimensions.
   b. Shop Connections: Provide bolted or welded shop connections.
   c. Field Connections: Provide bolted field connections.
5. Shop Painting: Clean surfaces to be primed of loose mill scale, rust, dirt, oil, grease, and other matter precluding paint bond.
   a. Follow procedures of SSPC-SP3 for power tool cleaning, SSPC-SP7 for brush-off blast cleaning, and SSPC-SP1 for solvent cleaning.
6. Prime structural steel primary and secondary framing members with manufacturer's standard rust-inhibitive primer.
7. Prime galvanized members, after phosphoric acid pretreatment, with manufacturer's standard zinc dust-zinc oxide primer.

D. Roofing and Siding: Provide roofing and siding sheets formed to general profile or configuration as indicated with sheet metal accessories factory formed of same material and finish as roofing and siding.
   1. Basis of Design: Kingspan KS Granitestone and KingRib; refer to Drawings.
   2. Roof Panels: Insulated configuration as indicated on Drawings with Kynar 500 or Hylar 5000 fluoropolymer factory finish in color as directed by Architect.
   3. Wall Panels: Two types required; insulated configuration as indicated on Drawings with Kynar 500 or Hylar 5000 fluoropolymer factory finish in color as directed by Architect.
   4. Insulation: Comply with California Building Code requirements including requirements for energy efficiency but not less than R-21 for wall assemblies and R-30 for roof assemblies.
   5. Interior Panel Facing: Provide interior metal facing for insulated roof and wall panels; not less than 22-gage.
      a. Provide metal-backed neoprene washers under heads of fasteners bearing on weather side of panels.
      b. Use galvanized steel, aluminum, or stainless-steel fasteners for exterior application and galvanized or cadmium plated fasteners for interior applications.
c. Locate and space fastenings for true vertical and horizontal alignment; use proper type fastening tools to obtain controlled uniform compression for positive seal without rupture of neoprene washer.

d. Provide fasteners with heads matching color of roofing or siding sheets by means of plastic caps or factory-applied coating.

   a. Cut or premold closure strips to match corrugation configuration of roofing and siding sheets.
   b. Provide closure strips where indicated or necessary to ensure weathertight construction.

8. Sealing Tape: Provide pressure sensitive 100 percent solids polyisobutylene compound sealing tape with release paper backing.
   a. Provide permanently elastic, nonsag, non-toxic, non-staining tape not less than 1/2" wide and 1/8" thick.

   a. Clean galvanized steel with an alkaline compound, then treat with a zinc phosphate conversion coating, and seal with a chromic acid rinse.
   b. Apply a 2-coat fluoropolymer coating system to pretreated steel.
      1) Coating shall consist of a primer applied to a dry film thickness of 0.15 mil to 0.25 mil, and a finish coat of polyvinyl fluoride or polyvinylidene fluoride applied to a dry film thickness of 0.80 mils to 1.3 mils.
   c. Colors as indicated or as selected by Architect from fluoropolymer finish manufacturers full range of colors excluding metallics.

E. Sheet Metal Accessories: Match roofing and siding; comply with general requirements SMACNA “Architectural Sheet Metal Manual”.

1. Gutters: Form gutters in sections not less than 8'-0" in length, complete with end pieces, outlet tubes and other special pieces that may be required.
   a. Join sections with riveted and soldered or sealed joints. Unless otherwise indicated, provide expansion-type slip joint at center of runs.
   b. Furnish gutter supports spaced at 42" on center, constructed of same metal as gutters.
   c. Provide gutter guard system in accordance with Section 01 11 07, Part 2.1 C3.
2. **Downspouts:** Form downspouts in sections approximately 10'-0" long, complete with elbows and offsets. Join sections with not less than 1-1/2" telescoping joints.
   a. Provide fasteners, designed to securely hold downspouts not less than 1" away from walls; locate fasteners at top and bottom and at approximately 5'-0" on center in between.
   b. Finish: Match wall panels.

3. **Ventilators:** Provide factory engineered and fabricated ventilators/operable louvers by building manufacturer and as required to comply with applicable codes.
   a. Finish: Match roof panels.
   b. Provide bird screens of 1/2" by 1/2" galvanized steel or expanded diamond mesh.

**F. Steel Sectional Overhead Doors:** Provide complete operating insulated metal panel type sectional overhead door assemblies including frames, sections, brackets, guides, tracks, counterbalance, hardware, operators, and installation accessories.

1. **Basis of Design:** Overhead Door Corp./Model 599, with custom RAL color as directed by Architect.

2. **Steel Door Sections:** Construct steel door sections from 24 gage galvanized structural quality carbon steel sheets complying with ASTM A446, Grade A, or ASTM A526 with minimum yield strength of 33,000 psi, minimum G90 zinc coating.
   a. Exterior Section Face: Provide flat, flush exterior section face to manufacturer's standards.
   b. Fabricate door sections from single sheet to provide units not more than 24" high, and nominal 2" deep.
      1) Roll horizontal meeting edges to form continuous shiplap, rabbeted, or keyed weatherseal, with continuous reinforcing flange.
   c. Enclose open section with 16 gage galvanized steel channel end stiles welded in place. Provide intermediate stiles, cut to door section profile, spaced at not more than 48" on center and welded in place.
   d. Reinforce bottom section with continuous channel or angle conforming to bottom section profile. Reinforce sections with continuous horizontal and diagonal reinforcing, as required by door width, and design wind loading.
   e. Insulate inner core of steel door sections with polyurethane foam type insulation for maximum thermal resistance; minimum R-value R17.5.

3. **Glazing:** Provide insulated glass lites as indicated on Drawings.
   a. Glass: Preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space with minus 20-degree F dew point.

c. System: Manufacturer’s standard dual seal system compatible with glazing system, and including spacers, desiccant, and standard corner construction.

a. Tempered Glass: Select glazing quality, clear float glass, fully tempered, ASTM C1048, Kind FT; nominal thickness 1/4”; safety glass.

d. Total Unit Thickness: 1”.

4. Glazing Accessories: Type recommended by manufacturer to suit security locations and applications for glazing installation.

a. Glass shall not touch metal or similar rigid materials.

5. Tracks, Supports and Accessories:

a. Tracks: Provide manufacturer’s standard galvanized steel track system, sized for door size and weight, and designed for clearances shown.

1) Provide complete track assembly including brackets, bracing and reinforcing for rigid support of ball bearing roller guides, for required door type and size.

2) Slot vertical sections of track at 2” on center for door drop safety device.

3) Slope tracks at proper angle from vertical, or otherwise design to ensure tight closure at jambs when door unit is closed. Weld or bolt to track supports.

b. Track Reinforcement and Supports: Provide galvanized steel track reinforcement and support members.

1) Secure, reinforce and support tracks as required for size and weight of door to provide strength and rigidity, and to ensure against sag, sway and detrimental vibration during opening and closing of doors.

c. Weatherseals: Provide continuous rubber, neoprene, or flexible vinyl adjustable weatherstrip gasket at tops and compressible astragal on bottoms of each overhead door.

d. Hardware: Provide extra heavy-duty type suitable for high use fire station application, rust-resistant hardware, with galvanized, cadmium-plated or stainless-steel fasteners to suit type of door.

1) Hinges: Provide extra heavy steel hinges at each end stile and at each intermediate stile in accordance with manufacturer’s recommendations for type of door.
2) Rollers: Provide extra heavy-duty rollers with steel ball bearings in case-hardened steel races, mounted with varying projections to suit slope of track.
   
a) Provide case-hardened steel roller tires of diameter to suit size of track.

e. Counterbalance: Provide manufacturer’s extra heavy duty counterbalance assembly, not less than 100-thousand-cycle springs.

f. Electric Door Operator: Furnish heavy duty commercial quality electric door operator assembly of size and capacity recommended and provided by door manufacturer.

1) Operator: Furnish complete with electric motor and factory prewired motor controls, gear reduction unit, solenoid operated brake, clutch, remote control stations, and control devices.

2) Electric Motors: Provide high-starting torque, reversible, constant duty, Class A insulated electric motors with overload protection.
   
a) Size to move door in either direction, from any position, at not less than 2/3' or more than 1' per second.

3) Remote Control Station: Provide surface-mounted, interior type, heavy-duty, full geared, momentary contact, 3-button control station, with push-button controls labeled "OPEN", "CLOSE" and "STOP".
   
a) Provide general purpose NEMA Type 1 enclosure.
   
b) Provide remote opener controls for use in apparatus.

4) Automatic Reversing Control: Furnish each door with wireless automatic safety switch, extending full width of door bottom, and located within neoprene or rubber astragal mounted to bottom door rail.
   
a) Contact with switch to immediately reverse downward door travel.

5) Electric Eye Control: Provide electric eye control system to prevent door from closing when object is located within line of tracks; locate at approximately 18" above finished floor.

G. Louvers: Provide manufacturer’s standard units of sizes indicated and capable of allowing air passage required for building and building mechanical systems; provide stainless-steel bird screens.

1. Refer to Mechanical Specifications for performance requirements.

H. Joint Sealants: Provide manufacturer’s premium commercial quality joint sealants but not less than joint sealants specified in Section 07 90 00 – Joint Sealants.
PART 3 - EXECUTION

3.1 ERECTION

A. Framing: Erect structural framing true to line, level and plumb, rigid and secure. Level base plates to true even plane with full bearing to supporting structures, set with double-nutted anchor bolts.

1. Use non-shrinking grout to obtain uniform bearing and to maintain level base line elevation. Moist cure grout for not less than 7 days after placement.

2. Tolerances: Framing members to be plumb, level, and properly aligned within industry standard tolerances.

B. Purlins and Girts: Provide purlins with tight fitting closure channels and fascias. Locate and space wall girts to suit door and window arrangements and heights.

1. Secure purlins and girts to structural framing and hold rigidly to straight line by sag rods.

C. Bracing: Provide diagonal rod or angle bracing in both roof and sidewalls as indicated.

1. Movement resisting frames may be used in lieu of sidewall rod bracing, to suit manufacturer’s standards.

2. Where diaphragm strength of roof or wall covering is adequate to resist wind forces, rod or other forms of bracing will not be required.

D. Framed Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical or electrical work.

1. Securely attach to building structural frame.

E. Roofing and Siding: Comply with manufacturer recommendations and installation instructions.

1. Arrange and nest sidelap joints so that prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation.

   a. Apply panels and associated items for neat and weathertight enclosure.

   b. Provide weatherseal under ridge cap. Flash and seal roof panels at eave and rake with rubber, neoprene, or other closures to exclude weather.

2. Roof Sheets: Provide sealant tape at lapped joints or ribbed or fluted roof sheets, and between roof sheeting and protruding equipment, vents, and accessories.

   a. Apply continuous ribbon of sealant tape to clean, dry surface of weather side of fastenings on end laps, and on side laps of corrugated nesting type, ribbed or fluted panels and elsewhere as necessary to make roof sheets weatherproof.
3. Wall Sheets: Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete and elsewhere as necessary for waterproofing.
   a. Handle and apply sealant and back-up in accordance with sealant manufacturer's recommendations.
   b. Align bottoms of wall panels and fasten panels with blind rivets, bolts, or self-tapping screws.
   c. When building height requires two rows of panels at gable ends, align lap of gable panels over wall panels at eave height.
   d. Install screw fasteners with power tool having controlled torque adjusted to compress neoprene washer tightly without damage to washer, screw threads or panels. Install screws in predrilled holes.

F. Sheet Metal Accessories: Install gutters, downspouts, ventilators, louvers, and other sheet metal accessories in accordance with manufacturer's recommendations for positive anchorage to building and weathertight mounting.

G. Steel Sectional Doors: Set doors and operating equipment complete with necessary hardware, jamb and head mold stops, anchors, inserts, hangers, and equipment supports in accordance with manufacturer's installation instructions.

   1. Adjust moving hardware for proper operation.

H. Joint Sealants: Conform to requirements specified in Section 07 90 00 – Joint Sealants.

3.2 FIELD PAINTING

A. Apply finish coating to following factory-primed structural framing components.

B. Finish colors as indicated or, if not indicated, as selected by Architect from manufacturer's full range of colors.

C. Cleaning and Touch-Up: Prior to application of finish coats, clean component surfaces of matter that could preclude paint bond.

   1. Touch-up abrasions, marks, skips or other defects to shop-primed surfaces with same type material as shop primer.

D. Protection: Protect work of other trades. Correct painting related damages by cleaning, repairing, or replacing, and refinishing as directed by Architect.

E. Coordination: Provide finish coats that are compatible with prime paints used. Provide barrier coats over incompatible primers where required.

   1. Notify Architect in writing of anticipated problems using specified coatings with substrates primed by others.
F. Surface Preparation: Perform preparation and cleaning procedures in strict accordance with coating manufacturer's instructions for each substrate condition.

1. Remove hardware and accessories, and similar items in place and not to be finish-painted or provide surface-applied protection.

2. Reinstall removed items.

G. Material Preparation: Mix, prepare and store painting and finishing materials in accordance with manufacturer's directions.

H. Application: Apply painting and finishing materials in accordance with manufacturer's directions. Use applicators and techniques best suited for material and surfaces to which applied.

1. Apply additional coats when undercoats, stains or other conditions show through final paint coat, until paint film is of uniform finish, color, and appearance.

2. Sand lightly between succeeding enamel or varnish coats. Thickness of not less than 2.5 mils for entire coating system of prime and finish coats.

3. Dissimilar Materials: Where aluminum surfaces contact ferrous metal or other incompatible materials, keep aluminum surfaces from direct contact by applications to the other material as follows:

   a. One coat of zinc chromate primer, FS TT-P-645, followed by two coats of aluminum paint, SSPC-Paint 101.

   b. In lieu of 2 coats of aluminum paint, apply one coat of high-build bituminous paint, SSPC-Paint 12, applied to thickness of 1/16" over zinc chromate primer.

   c. Back paint aluminum surface where it is impractical to paint the other surface.

END OF SECTION
PART 1 GENERAL

1.1 RELATED REQUIREMENTS

A. The Contract Conditions, Supplemental Conditions and Division 1 - General Requirements are hereby made a part of this Section of the Specifications.

1.2 SECTION INCLUDES

A. Work Included: Work under this Design-Build section includes, but is not necessarily limited to:

1. All labor, materials, tools, appliances and equipment that are required to design, furnish, and install the complete automatic sprinkler installation for this section of the work and as specified in the following guide specifications including that which is reasonably inferred.

2. Design and install a new and complete supervised building automatic sprinkler system as indicated on the Drawings and in these specifications including all piping, heads, valves, water flow switches, supervisory devices, and fire department connections.

3. Installation of wet standpipes including outlets on roof.

4. Connect to the fire water service at the site of the building.

5. Complete fire sprinkler drawings for the building and calculations as required to obtain a building permit and as required to resolve all coordination issues with the site, structure, lighting, electrical, plumbing, and mechanical work.

6. Repair of all damage done to premises as a result of this installation, and removal of all debris left by those engaged in this installation.

7. Testing and adjusting of piping and equipment.

8. Cleaning of all equipment and materials at time building is turned over to the Owner.

9. All insurance and taxes required and applicable.

10. Cutting, patching, and sawcutting, core-drilling.
11. Excavation, trenching, and backfilling.

12. All rigging, hoisting, transportation, and associated work necessary for placement of all equipment in its final location.

13. Preparation of Project Record Documents.

1.3 RELATED SECTIONS

A. Earthwork: Trenching and Backfilling.

B. Site Utilities.

C. Water Systems.

D. Site Fire Water.

E. Interior Painting: Field Painting of Exposed Equipment and Piping Not Prefinished.

F. Section 22 00 00 - Plumbing.

G. Section 23 00 00 - Mechanical.

H. Electrical: Electrical Material and Connections.

I. Fire Alarm System.

1.4 GENERAL REQUIREMENTS

A. Visit the site of the work, take measurements and such other information as may be necessary for an intelligent bid. No allowance shall subsequently be made for any extra expense due to failure or neglect on the part of the bidder to make such examination, including other difficulties visually observed during site visit.

B. Secure all permits, licenses and inspections required to begin, perform and complete the work. At completion of the work, deliver to the Owner a certificate of all inspections acceptances issued by the Jurisdictional Authorities, approving the complete installation.

C. Follow manufacturer's directions in all cases where manufacturers of equipment used furnish directions covering points not shown on the Drawings or specified herein.

D. Install all work in strict accordance with the latest rules of any local or state codes and ordinances, local Fire Department and NFPA. No extra charge will be paid for furnishing items required by the regulations but not specified herein. Rulings and interpretations of the agencies shall be considered a part of the regulations if commonly known to the trade prior to the submittal of bids.
E. Operation and Maintenance Instructions: Submit all instruction sheets, bulletins and all pertinent information for proper operation and adjustment of each and every piece of equipment furnished under provisions of Section 01730. This information shall be bound in a hard cloth covered, adjustable loose-leaf binder such as McBee and shall be typed and indexed into sections and labeled for easy reference. Information which does not concern equipment furnished shall not be included.

F. Carefully coordinate all pipe runs with all other Divisions and the Architect prior to installation.

G. Be responsible for damage to any of this work before acceptance. Securely cover all openings, apparatus, fixtures and appliance, both before and after setting into place, to prevent obstructions in the pipes and breakage or disfigurement of equipment. Should the equipment become damaged, restore it to its original condition and finish before final acceptance.

H. Be responsible for, and repair all damage to, any part of the premises, caused by leaks or breaks in pipe or equipment furnished or installed for a period of one (1) year after date of acceptance of the work.

I. Coordinate with others for provisions of Section 02220 for Trenching and Backfill.

J. Coordinate with Sections 02500, 02700, 02705, and 02717 and Civil Engineering drawings for fire water services.

K. Provide freeze protection measures for all piping systems exposed to weather and/or outside the buildings per NFPA 13 requirements.

1.5 SUBMITTALS

A. Sprinkler Shop Drawings and Calculations: The building, as directed in paragraph C below, shall be fully sprinklered in accordance with NFPA 13 and the requirements of the local Fire and Building Departments. System shall be hydraulically calculated in accordance with NFPA 13 and in accordance with the requirements of the local Fire Department. Submit shop drawings, approved by the local Fire Department, showing the complete piping and sprinkler head layout for the sprinklered areas, including complete hydraulic computer calculations. These Drawings shall indicate standpipes, hose outlets, main riser locations, and accurate locations of all piping, sprinkler heads, drain apparatus associated with these systems in respect to new architectural conditions, structural conditions, lighting layouts, diffuser layouts, plumbing, mechanical, and electrical layouts. Show sprinkler head locations on latest architectural reflected ceiling plan with all lighting and mechanical air diffusers and registers shown. Submittals without this drawing will be automatically rejected. Approval of the same Drawings and calculations must first be obtained from the local Fire Department before submittal to the Architect. Drawings shall be to the same scale, same sheet size, and shall bear a title block, all in accordance with
Architectural Drawings. Architectural backgrounds shall be in accordance with the latest Architectural Drawings. If, upon preliminary submittal of drawings, there are corrections to be made, such as head locations, pipe locations, riser location, drain locations, etc., corrections shall be made and the corrected drawings, along with revised calculations, shall be resubmitted for approval without extra cost. These drawings shall be corrected and approved before starting work. The decision of the Architect shall be final on all items. These drawings and calculations, upon final approval, and including all "As-Built" drawings and calculation changes at completion of the job, shall become a part of the contract documents. Calculations shall be done on standard 8-1/2" x 11" sheets, all in accordance with NFPA 13 and in accordance with the requirements of the local Fire Department, and shall indicate pipe numbers; beginning and end node points; all referenced on the shop drawings, and system demand curves. Calculations shall be bound and indexed in a loose-leaf binder same as for operating and maintenance instructions.

B. All construction shall conform to the requirement of the local Fire Department. All required permits shall be obtained. The design and installation drawings shall be submitted along with required fees for permits to the Fire Prevention Bureau.

C. The design requirements for this project are to be ultimately decided by the local Fire Department. The Contractor must verify all requirements before providing design drawings and calculations and before any work is installed. Bids shall be based on the following preliminary requirements.

1. Provide fire sprinkler systems to comply with NFPA 13 with the local Fire Department modifications. Include complete coverage of the attic areas. Metal piping is required in the attic areas and anywhere piping is not concealed.

2. Provide fire sprinkler coverage where required at overhangs, entry structures, etc. and at all storage enclosures within 5 feet of the buildings.

3. The fire sprinkler coverage for the elevator machine room shall be installed in accordance with the requirements of the local Fire Department.

D. Upon completion of review of the above shop drawings and calculations, submit a list of all materials to be used. This list shall include the manufacturer's name, model, type, number and size of equipment and the capacity of the equipment. All equipment shall be submitted at one time. Any material or equipment installed without approval of the Architect shall be subject to immediate removal, if found unsatisfactory.

1.6 PROJECT RECORD DOCUMENTS

A. Maintain project record documents in accordance with Section 01720.
1.7 WARRANTY

A. Comply with Section 01740.

B. Be responsible for, and repair all damage to, any part of the premises, caused by leaks or breaks in pipe or equipment furnished or installed for a period of one (1) year after date of acceptance of the work.

PART 2 - MATERIALS

2.1 PRODUCTS

A. Fire Protection Pipe Below Grade (5 Feet from Building): ANSI Specification A21.50 ductile iron Class 50 with Tyton joints, and ANSI Specification A21.10 cast iron Tyton Fittings. Pipe and fittings shall be cement line 1/16-inch minimum thickness and bituminous coated on exterior. Install pipe in accordance with manufacturer's directions. Pipe shall have a working pressure rating of 150 psi. Fittings shall have a working pressure rating of 125 psi. Double wrap all piping below grade with Tapecoat CT, or equal.

B. Fire Protection Piping Above Grade (NFPA 13 System Areas, All Piping in Attics, and All Exposed Piping): Allied Tubing, or approved equal, ASTM A-135 and/or A-795, schedule 10 roll grooved black steel pipe with Victaulic fittings and couplings and schedule 40 black steel threaded pipe and ANSI B16.4 200 PSI cold water, black cast iron threaded fittings, or approved equal. Piping must have the ABF coating that fights the formation of microbiologically influenced corrosion (MIC). Piping must be recognized by UL and FM as approved piping for fire sprinkler systems and must have a corrosion resistance factor of 1.0 or greater.

E. Automatic Sprinkler Heads

1. Where Piping is Run Exposed or Where Piping is Run Concealed to Serve Sprinkler Heads Above Ceilings: Viking model VK300/VK302 pendant or upright solder type automatic water spray heads with standard plain brass finish.

2. Where Piping is Run Concealed to Serve Fire Sprinkler Heads in the Building Spaces Below Ceilings: Sprinkler heads shall be Viking Model VK302, or approved equal, complete with Model E-2 recessed escutcheon with chrome finish.

3. Provide and install protective baskets on all fire sprinkler heads in the apparatus bay.

4. Provide cabinet for extra fire sprinkler heads. Mount cabinet near fire sprinkler riser. Provide extra heads of each type for replacement, and a head wrench as required by NFPA.
5. All Heads shall have temperature ratings as required for the service indicated, and shall meet the requirements of the standards of the National Fire Protection Association.

F. Fire Protection Valves: All valves must be U.L. listed and F.M. approved.

1. Detector Check Valve Assembly: Febco, Watts, or Nibco, detector type check valve with two OS&Y gate valves, test cocks, and Potter OSYS-B, OSYSU-A1 or OSYSU-A2 supervisory switches. Detector check assembly shall conform with the local Fire Department requirements.

2. Butterfly Valves: Nibco model W-002-N6, Watts, Red and White, or Crane valve for fire service, complete with Ny-plate nickel-plated ductile iron disc, stainless steel stem, lug steel bodies, Buna-N seats, gear operator with crank handle, indicator dial plate, and suitable for 175 psi working pressure. Provide tamper switch with contacts and conduit connection as required for wiring to remote alarm system. Valve shall have lug type flanges.

3. Check Valve: Nibco model F-908, Watts, Red and White, or Crane, U.L. approved for fire service, 200 PSI water pressure valve with iron bronze trim, bronze faced disc, and lug type flanges.


5. Drain and Test Valves: United model 45, Nibco, Watts, or Red and White, 175 psi rating, threaded ends, and angle or globe type as required.

F. Wet Standpipe Valve and Cabinet: Potter Roemer model 1812 or Grinnell, semi-recessed 20 gauge, galvanized steel valve cabinet with continuous hinge, white polyester finish, and model 4065 brass hose valve, 2 1/2 inch size with cap and chain.

G. Exterior Wet Standpipe Connection: Potter-Roemer Model 581 or Grinnell, brass 2 1/2 inch size wall outlet with wall plate, cap, and chain.

H. Fire Department Connections: Potter-Roemer model 5730, Grinnell, Viking, or Watts, 4" x 2 1/2" x 2 1/2" Siamese inlet with cast brass body, double clappers, branded "Auto Sprinkler" or "Standpipe" as applicable, and brass caps with chains. Mount on schedule 40 galvanized steel post.

I. Water Flow Switches: Grinnell model VSR-D, Fike, Pyrotronics, or Viking, U.L. approved, with retard mechanism, conduit connection and contacts as required for wiring to remote alarm system.
J. Pressure Gauges: Weksler or Ashcroft with stainless steel movement, phosphor bronze bourdon tube, die cast aluminum case with threaded ring, bottom connection, siphon, gauge cock, and a 3 1/2" diameter dial, range 0-200 PSI. Install a pressure gauge at the building riser.

K. Sight Glasses: Grinnell Model F 1321, AGF, or Central, unit rated for 175 psi, 1-inch size, UL listed, and threaded ends.

L. Union Orifices: Black cast iron union with corrosion-resistant standard orifice.

M. Pipe Sleeves: ADJUST-CRETE, or approved equal, 22 gauge, electro-galvanized sheet metal adjustable sleeve. Pack all sleeves fire tight.

N. Pipe Supporting: 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 piping from, or brace to, ducts, other pipes, conduits, or any materials except building structure. Use 12 gauge 1-5/8" square channel supports with pipe clamps, where piping is supported close to wall, ceiling, or floor.

O. Escutcheons: Chromium plated steel floor and ceiling plates with set screw to hold securely in place.

P. Fire Rated Pipe Penetrations: Hilti, 3M, or approved equal, U.L. listed assemblies. Install rated penetrations at all fire rated walls, floor, ceilings, roof, etc.

PART 3 - EXECUTION

3.1 GENERAL

A. Conceal all piping in furred walls, partitions, ceilings, and pipe spaces unless approved in writing by the Architect, except at apartment decks.

B. Any exposed piping shall be installed parallel to or at right angles with building walls and tight to walls or ceilings wherever possible. Coordinate pipe locations with Architect prior to installation.

C. Seal and caulk watertight all below grade penetrations into the building.

D. Where exposed pipes pass through walls, ceilings or floors, fire caulk and fit with escutcheon plates. Escutcheon plates must be securely held in position allowing enough clearance to care for expansion and shall be sufficient size to cover the opening around the pipe.

E. Install swing joints at all seismic building separations. Swing joints shall accommodate 6 inches of differential movement.

F. In general, all piping shall be run as high as possible above ceilings or floors.
G. All piping shall be supported in accordance with the requirements of NFPA 13 and the local building code. Provide sway bracing where required.

H. All socket type joints shall be made up employing primers and solvent cements that meet or exceed the requirements of ASTM F656 and ASTM F493, respectively. The standard practice for safe handling of primers and solvent cements shall be in accordance with ASTM F402. Both primer and solvent cement shall be listed by the National Sanitation Foundation for use with potable water and approved by the CPVC manufacturers.

I. The CPVC sprinkler system shall be hydraulically calculated using a Hazen-Williams C-Factor of 150 and designed in accordance with the Standard for Installation of Sprinkler Systems, NFPA 13.

J. Installation practices such as pipe support spacing, bracing, allowance for thermal expansion/contraction, solvent cementing and handling and storage shall be in accordance with the manufacturer's installation instructions and the UL listing which includes installation limitations.

K. Only Teflon tape shall be used in making threaded connections. Never use air or compressed gas for pressure testing.

L. Connect alarm system to central reporting security monitoring company to be selected by Owner.

M. Coordinate installation with security monitoring system, water supply, electrical work, plumbing, structural and mechanical work.

N. Furnish and install all necessary equipment and devices to tie to the building security and monitoring system.

O. The sprinkler head which serves the elevator equipment room shall be rated for 212°F. A heat detector set for 180°F. shall be installed in that room which can signal the shut down of the elevator equipment. Coordinate with the Electrical Division. Follow the special requirements of the local Fire Department.

3.2 MICROBIOLOGICALLY INFLUENCED CORROSION (MIC)


B. The water supply shall be tested for the existence of the microbes that cause MIC. If the microbes exist, the piping system and the water shall be treated to kill the microbes.

C. Submit a copy of the test results that show that the system is free from the microbes that cause MIC.
3.3 EXCAVATING, TRENCHING AND BACKFILLING

A. Trenches for underground piping shall have uniform grades same as for pipe so that pipe will bear on solid ground. Loose earth shall be tamped solid around sides and top of pipe and remainder thoroughly compacted to prevent settlement of the surface.

B. Provide and maintain dewatering pumps as required. Backfill shall not be placed on or around piping for 24 hours after pipe joints have been made and before lines are properly tested and approved.

C. Provide shoring and cross-bracing of sufficient strength to properly support the walls of all excavations at depth of four (4) feet or more as required to protect personnel and as required by OSHA.

D. Minimum cover for piping exterior to the building shall be 24" below finish grade or as otherwise determined by invert elevations. Verify all piping elevations, and invert elevations before starting work.

3.4 CLEANING

A. The intent of this Specification is that all equipment and materials furnished shall be completely dust free, clean and rust free and freshly painted or polished when the final acceptance inspection is made. All systems of any nature shall be thoroughly cleaned and flushed of all pipe contaminants such as cuttings, filings, lubricant, rust, scale, grease, debris, etc., and thoroughly flushed out with clear, clean water until clean in the opinion of the Inspector. Any piece of equipment or part of any system which malfunctions or is damaged due to failure or neglect to observe this paragraph shall be repaired or replaced without extra expense to Owner.

B. Mask off all sprinkler heads during painting. Remove tape at completion of painting.

3.5 IDENTIFICATION SIGNS

A. Riser valves, drain valves, test connections, etc. shall be fitted with approved enameled signs indicating their purpose and use, and shall be securely affixed to their respective component.

3.6 ADJUSTING

A. Demonstrate proper operation of new flow switch and tamper switches.

3.7 TESTING

A. All Sprinkler Piping Systems: Hydrostatically test and prove tight under 200 PSI of water and in accordance with local Fire Department requirements.

B. Tests: Shall be applied for a minimum period of 2 hours or until tests are complete in the opinion of the Inspecting authority.
C. MIC Test Reports: Submit test reports that show that no microbiologically influenced corrosion is present in the piping.

D. After all tests are successfully completed and the Record Drawings have been provided, the Contractor shall submit properly executed "Contractors Materials and Test Certificate" as required by NFPA 13. Install a hydraulic data nameplate to the base of each riser.

END OF SECTION
PART 1 - GENERAL

1.1 SCOPE

A. The General Conditions, Supplementary Conditions and Division 1 - General Requirements are hereby made a part of this Section of the Specifications.

1.2 DESCRIPTION

A. Work Included

1. All labor materials, tools, appliances and equipment that are required to furnish and install the complete installation shown on the Drawings for this Section of the work and/or specified in the following Specifications, including that which is reasonable inferred.

2. Soil, waste, and vent piping including connection to piping outside the building.

3. Hot water and cold water piping including installation of the water heating equipment. Work includes connection to cold water piping outside building.

4. Propane piping including connection to all gas fired equipment.

5. Furnishing and installing plumbing fixtures.

6. Drains and cleanouts.

7. Careful isolation of all piping systems from the building structure. Provide isolators with hair felt to provide acoustic isolation.

8. Repair of all damage done to premises as a result of this installation and removal of all debris left by those engaged in this installation.


10. Flashing and counterflashing of piping through roof.

11. Cutting, patching, sawcutting, and core-drilling.

12. Testing and adjusting of piping and equipment.

13. Be responsible for all damage to any part of the premises caused by leaks or breaks in pipe or equipment furnished or installed under this Section of the Work for a period of one (1) year after date of acceptance of the Work.

14. Cleanliness of all exposed materials and equipment at time building is turned over to the Owner.
15. All insurance, fees and taxes required and applicable shall be included. Permit fees will be paid by the Owner.

16. All rigging, hoisting, transportation and associated work necessary for placement of all equipment in the final location shown.

17. Fire stopping of all piping through rated assemblies.

18. As-built record drawings.

1.3 RELATED WORK IN OTHER SECTIONS

A. Water System

B. Sanitary Sewage Systems

C. Joint Sealants

D. Electrical material and connections to equipment.

E. Interior and exterior painting: Prime and finish painting.

1.4 GENERAL REQUIREMENTS

A. Visit the site of the work, compare it with the Drawings and Specifications as to the conditions under which Work is to be performed, ascertain and check all conditions and elevations and take all measurements which may affect the Work.

B. Permit fees will be paid by the Owner. Pay all fees and obtain all licenses necessary for the completion of the Work and notify all interested authorities when this Work is ready for any necessary or required inspections. Deliver to the Owner a certificate of all inspections and acceptances issued by the jurisdictional authorities, approving the complete plumbing installation.

C. All work shall be in strict accordance with the latest rules of any local or State ordinances and codes, UPC, building codes, and the NFPA. No extra charge will be paid for furnishing items required by the regulations but not specified herein or shown on the Drawings. Rulings and interpretations of the agencies shall be considered as part of the regulations if commonly known to the trade prior to the submittal of bids.

D. Do not permit or cause any Work to be covered or enclosed until it has been inspected, tested and approved. Should any of the Work be enclosed or covered before inspection and test, the Contractor shall, at his own expense, uncover the Work; and, after it has been inspected, tested and approved, make all repairs with such materials as may be required to restore his Work and that of the other Work to its original and proper condition.

E. Be responsible for damage to any of this work before acceptance. Securely cover all openings, apparatus, fixtures, and appliances, both before and after setting into place, to prevent obstructions in the pipes and breakage or disfigurement of equipment. Should the equipment become damaged, restore it to its original condition and finish before final acceptance without change in Contract cost.
F. Shop Drawings Submittals - Comply with Specification Section 01 77 00.

1.5 OPERATION AND MAINTENANCE MANUALS

A. Furnish to the Owner three (3) complete separately bound, sets of operating instructions, including manufacturer's literature of all equipment and controls, covering all items of instruction, operation and maintenance, and including copies of manufacturer's startup forms showing initial programmed settings and warranty documentation for all equipment. Final inspection will not be made until these instructions are received. The following items are suggested but not totally inclusive.
   1. Water Heater
   2. Trap Primers
   3. Plumbing Fixtures

1.06 AS-BUILT DRAWINGS: At completion of the work, turn over to the Architect one (1) complete set of reproducible drawings incorporating the original drawings and all changes made to the original drawings. Reproducible prints of the original drawings will be provided by the Architect. Make all changes to these reproducible drawings to provide a complete and accurate description and record of all the work as installed.

1.07 GUARANTEE: At completion of the work, furnish the Owner a written guarantee, in triplicate, that work has been performed in accordance with Plans and Specifications and guarantee to replace or repair, to the satisfaction of the Owner, any portion of the new work that fails within a period of one (1) year after final acceptance, provided such failure is due to defects in material or workmanship. Also agree to replace or repair, with like workmanship and materials, any part of the building or equipment installed by other trades but damaged in installing this work.

PART 2 - MATERIALS

2.1

A. Equipment and Materials: All materials shall be new.

B. Pipe and Fittings
   1. Cast Iron Soil Pipe and Fittings: ASTM A74 standard weight hubless cast iron soil pipe and fittings with standard grade and heavy grade stainless steel couplings with neoprene gaskets, as hereinafter indicated.
   2. Steel Pipe: ANSI B36.10, Schedule 40 black or galvanized as indicated hereinafter.
   4. Copper Tubing: ANSI H23, Type "K" or "L" hard drawn water service tubing, as hereinafter indicated.
   5. Fittings for Copper Tubing: ANSI B16.22, wrought copper sweat type.
6. Unions: For steel pipe shall be malleable iron or steel ground joint pattern, 150 PSI. For copper pipe shall be 150 PSI ground joint cast bronze unions with sweat connections.

7. Nipples: Cut from same pipe as specified for the system in which the nipple is used.

8. Solder for Copper Tubing Joints: Shall be 95/5. Charred and collapsed pipe and fittings due to excessive heating will not be permitted and shall be removed from the job site.

9. Dielectric Insulating Unions: EPCO, or equal, dielectric nut-type or flange-type unions with gasket material suitable for service and temperature in which they are required.

10. Threaded-to-Solder Adapter: As specified for solder-type fittings.

C. Valves

1. Ball Valves: Nibco model T-580, Red & White, Watts, or Crane, bronze valve with teflon seats and rated at 400 PSI WOG.

2. Gas Cocks: DeZurik Series 400, Red & White, Watts, or Crane, eccentric plug valve complete with 125 PSI cast iron body, flanged connection, and wrench. Valve should be AGA approved for gas service.

3. Double Check Valve: Febco model 805Y, Watts, Nibco, or Crane, valve assembly with two check valves, two gate valves, and test cocks. Unit shall be an all bronze assembly.

D. Strainers: Strainers (sediment separators) shall be Watts model 777, Bailey, Nibco, or Crane, screwed bronze strainers with 20 mesh stainless steel screen with seat gasket, built for a pressure of 125 PSI at 450o F.

E. Water Pressure Regulator: Watts model #U5B, Bailey, Nibco, or Crane, unit with bronze construction, stainless steel seat, stainless steel integral strainer, high temperature diaphragm, union inlet, and built-in thermal expansion bypass equalizer.

F. Pipe Hangers and Supports: Provide support as required by the Uniform Plumbing Code and as required for proper support free of sways and bending. Provide hair felt isolators to separate pipes from hangers. All pipes must be isolated from the structure.

G. Drains and Cleanouts: Zurn, Josam, or J. R. Smith. Model numbers given are for Zurn.

1. Floor Drains: ZN-508, 3" size, extra heavy duty dura coated cast-iron body with 9" diameter cast strainer, trap primer connection, and membrane flashing collar.

2. Floor Cleanouts: Z-1400-2 cast iron extra heavy duty cleanout with adjustable round heavy-duty scoriated nickel-bronze top, and gasketed
cover. Furnish and install carpet marker with chrome trim ring in carpeted areas.

3. Furnish suitable wrought iron or steel wrenches for each type of cleanout or plug cap.

H. Hose Bibbs: Woodford model 26, or approved equal, 3/4" size, loose key, rough brass with non removable vacuum breaker.

I. Plumbing Fixtures: Sterling, Kohler, or American Standard. Model numbers given are for Sterling, unless otherwise indicated.

1. Point up joints between fixtures and wall or floor with white mastic. Mastic shall have sufficient resiliency to prevent cracking or pulling away from the wall or floor due to fixture movement.

2. Select plumbing fixtures for uniformity of lines.

3. Provide tubing supplies traps, pipe escutcheons, and wastes to wall of not less than #17 "B&S" gauge polished brass, chromium-plated. Cast ironware shall be white acid resisting enameled. China-work shall be twice-fired white vitreous china.

4. Water Closets: Sterling "Windham" model 402315, Kohler or American Standard, 17 1/2" high, floor mounted tank type toilet with elongated bowl, tank, float valve, chrome trip lever, and complete with bolt caps, white plastic open-front seat without cover in common areas and white closed front seat with cover in apartments, water saving 1.6 GPF flushing assembly, and threaded Speedway supply stop. All water closets shall be accessible.

5. Lavatories

a. Wall Mounted Lavatories: Kohler "Kingston" model K 2005, Sterling, or American Standard, 21 1/4" x 18 1/8" vitreous china with concealed arm hangers, Delta model 520, single handle, ADA accessible faucet with chrome finish and offset waste with open grid strainer, P trap and wall escutcheon, and threaded Speedway supply stops. Furnish and install all necessary mounting accessories. Provide fourth drilling for soap dispenser.

c. Insulate hot water piping, waste piping and P-trap exposed under all lavatories. Use Skal-Gard, or approved equal, material.

J. Instantaneous Electric Water Heater (EWH-1): Chronomite, Stiebel -Eltron, or approved equal, mini-tank type electric resistance water heater, complete with single element, ASME code temperature and pressure relief valve, integral temperature controller, and drain pan with drain routed to the exterior.

K. Hot Water Piping Insulation: Insulate all hot water with Armstrong Armaflex. Apply and finish insulation according to manufacturer's recommendations. Install 26 gauge x 6" long galvanized sheet metal shields completely around insulation at each pipe supporting device. Insulation thickness shall be as follows:
1. Hot Water Piping Up to 1" Size: 1" thick insulation.

L. Expansion Tanks: Amtrol model ST-5C, or Watts, vertical expansion tank.

M. Fire Rated Pipe Penetrations: 3M or equal U.L. listed assemblies. Seal all rated wall, floor, shaft, roof, and other penetrations.

N. Access Panel: Karp, or approved equal, with 14 gauge steel door, 16 gauge steel frame. Door shall have key operated cylinder lock. Door shall be minimum 12" x 12" size, or as noted on Drawings, or as required to provide proper access to valves and equipment and shall be flush with finished surfaces. Paint access door to match wall or ceiling.

O. Escutcheon Plates: Chromium-plated steel floor, wall, and ceiling plates with setscrew to hold firmly in place.

P. Flashing and Counterflashing: For all pipe penetrations exposed to weather areas shall be furnished and installed by this Section shall be Glenco, or approved equal, 4-lb. sheet lead with 12" skirt.


R. Trap Primers: Precision Plumbing Products or Zurn brass trap primer with vacuum breaker and union connections. Furnish and install as directed by local authorities. Trap primers shall be installed in accessible locations behind a chromium-plated steel access panel.

S. Flexible Pipe Connections: Flexonics PCS series, Keflex, or American Brass Company, with stainless steel construction flexible braided hose, and threaded ends or flanged. Unit shall be rated at 180 psi with 250 degrees F. water. Pipe material shall match the material of the connecting piping.

T. Water Hammer Arrestors: Zurn, Jay R. Smith, Josam, or Watts, conforming to ASME A112.26 1M, ASSE 1010, or PDI WH-201, bellows or piston type with pressurized cushioning chamber. Sizes shall be based on water supply fixture units, ASME A112.26 sizes "A" through "F" and PDI WH-201 sizes "A" through "F". The Contractor shall install air chambers where specified hereinafter. Install water hammer arrestors at water heaters, at each bank of clothes washers, and at the future ice maker. Water hammer arrestors must be accessible for servicing and inspection.

PART 3 - EXECUTION

3.1 PIPING

A. General

1. Carry all horizontal lines of pipe on specified hangers properly spaced and set to allow the pipe to adjust for expansion and contraction.

2. Conceal all piping above ceilings, in furred walls and partitions and pipe spaces when possible. Check all piping runs beforehand with all other trades. Run piping to maintain proper clearance for maintenance and
access. Run piping in strict coordination with mechanical ducts and equipment, 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 and pitches of lines before starting work.

3. All piping shall be installed free from traps and air pockets.

4. 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 piping from, or brace to, ducts, other pipes, conduit, or any materials except building structure. Piping or equipment shall be rigid and immobile and shall not be supported or hung by wire rope, plumber's tape or blocking of any kind. Double wrap copper pipe with heavy vinyl tape where pipe comes in contact with ferrous materials or concrete.

5. Piping at all supply stops, faucets, etc. shall be rigidly supported in the wall in order to provide a rigid installation at the wall penetration.

6. Support Piping From Structure By Hangers Spaced As Follows: Horizontal piping shall be supported by pipe hangers as hereinbefore specified. Hangers shall be spaced as indicated in the Uniform Plumbing Code. Each branch over 4 feet long shall have at least one hanger. Provide pipe anchors and sway braces to basic building structure where required for rigidity.

7. Furnish and install dielectric insulating unions or insulating flanges as hereinbefore specified at all connections of ferrous and nonferrous piping.

8. Install unions adjacent to threaded equipment and at other points where required for disassembly.

9. No valve and no piece of equipment or trim shall support the weight of any pipe. Install all valves, vents, traps, cleanouts and other trim in accessible locations.

10. Whenever 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.

11. Where exposed pipes pass through walls, ceilings, or floors, fit pipes in all finished rooms and conspicuous locations with escutcheon plates. Escutcheon plates must be securely held in position allowing enough clearance to care for expansion and shall be sufficient size to cover the opening around the pipe.

12. Soil, Waste, Vent, Hot and Cold Water Branch Piping: To fixtures shall be as follows, unless otherwise shown on the Drawings and specified herein:
B. Soil, Waste, and Vent Piping

1. Waste and vent piping above and below grade shall be hubless cast iron soil pipe and fittings with stainless steel couplings with neoprene gaskets.

2. Piping which penetrates fire rated floors shall be type L copper, cast iron, or steel.

3. Provide cleanout plugs where shown or required for proper access to system.

4. Where pipes pass through roof, flash and counter-flash as detailed on the Architectural Drawings, with collar minimum height of 6”. Extend flat piece in plane of roof, 12” outside of pipe. Counterflash from top pipe to roof line. Flashing shall be in accordance with the National Roofing Contractors’ Association guidelines.

5. Install vents through roof to keep 10'-0" clear to all air intakes.

6. All fixtures shall be trapped and vented.

C. Hot Water and Cold Water Piping

1. Piping above grade and within the building shall be "L" copper tubing with wrought copper sweat type fittings.

2. Cold water piping below grade shall be type "K" copper tubing and wrought copper sweat type fittings.

3. Threaded Valves: Shall be installed with threaded-to-solder adapters.

4. Each connection to, faucet, or plumbing fixture shall have an air changer 18" long placed in a vertical position and shall be one (1) pipe size larger than pipe served.

D. Gas Piping


2. Gas Piping Above Grade (Inside of the Building): Schedule 40 black steel pipe with black malleable iron fittings.

E. Condensate Drain Piping: Type "M" copper with sloped drainage fittings.

3.2 EXCAVATING, TRENCHING AND BACKFILLING
A. Perform all excavating, trenching, and backfilling required for this section of the Work.

B. Trenches for underground piping shall have uniform grades same as for the pipe so that pipe will bear on solid ground. Loose earth shall be tamped solid around sides and top of the pipe and remainder thoroughly compacted to prevent settlement of the surface.

C. Provide and maintain dewatering pumps as required. After piping has been installed, it shall be inspected and approved before backfilling. Backfill shall not be placed on or around the piping for 24 hours after pipe joints have been made or before lines are properly tested and approved.

D. Provide shoring and cross bracing of sufficient strength to properly support the walls of all excavations at a depth of four (4) feet or more and as required to protect personnel.

E. Minimum bury for piping exterior to the building shall be 30" or shall comply with the requirements of the soils report.

3.3 CLEANING

A. Clean fixtures with soap and water. Remove marks and labels. Clean and polish chrome. Remove paint, concrete, plaster and other foreign materials.

B. Clean all drains of dirt and debris.

C. Thoroughly clean and flush all systems of all pipe contaminants such as cuttings, filings, lubricant, rust, scale, grease, solder, flux, welding residue, debris, etc., and thoroughly flush out with clear clean water until clean in the opinion of the inspector.

3.4 ADJUSTMENTS

A. Adjust the water heater and all outlets and faucets to their normal working conditions.

3.5 TESTING

A. Soil, Waste, and Vent Piping: Test and prove tight in accordance with the Plumbing Code.

B. Hot Water and Cold Water Piping: Hydrostatically test and prove tight under a pressure of 125 PSI at the highest point.

C. Propane Piping: Test and prove tight in accordance with the Plumbing Code.

D. Condensate Drain Piping: Hydrostatically test and prove tight under a pressure of 50 PSI at the highest point.

E. All tests shall be maintained for 2 hours or until complete and acceptable in the opinion of the inspector.

3.6 STERILIZATION OF HOT AND COLD WATER SYSTEMS
A. Industrial Supply Company (925) 284-1511, Bennett Marine Utility, Inc., or as indicated below. At completion of testing and adjusting and before hot and cold water systems are put into use, they shall be sterilized in strict accordance with AWWA, U.S. Department of Public Health, and local and State requirements. Until sterilization of the water system has been made, all water outlets shall have signs posted at their location stating the water system has not been sterilized and shall not be used for human consumption. Alternate means of providing protection can be used by the Contractor at his own risk. Prior to final acceptance, submit a certificate of sterilization together with bacteriological reports to the Architect stating that the work has been done in accordance with the Specifications. At the same time, submit a copy of the final report to the Department of Public Health prior to placing the systems in use.

END OF SECTION
SECTION 23 00 00

HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS

PART 1 - 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 DESCRIPTION

A. Work Included

1. All labor, materials, tools, appliances and equipment that are required to furnish and install the complete installation shown on the Drawings for this Division of the work and/or specified in the following Specification, including that which is reasonably inferred.

2. All work involved in making stands and supports for all equipment requiring them.

3. Cooperation with other crafts in putting the installation in place at a time when space required is accessible.

4. Repair of all damage done to premises as a result of this installation and removal of all debris left by those engaged in this installation.

5. Cleanliness of all exposed materials and equipment at time building is turned over to the Owner.

6. Access panels in ductwork for dampers, control devices, and cleaning.

7. All insurance, fees and taxes required and applicable are included.

8. Preparation of shop drawings.

9. Supervision of painting of materials and equipment installed by this Division.


11. Preparation of As-Built drawings for ducting systems to show alignment, sizes, etc.

12. Adjusting and testing of air flow, controls, and equipment.

13. Preparation of coordination drawings.

B. Work Excluded

1. Electrical power material and connections to equipment, except as noted.

2. Motor starters, unless specified.

3. Framing around ducts and diffusers through walls and slabs.

4. Finish painting.

1.3 REQUIREMENTS

A. Examination of Premises: Examination of premises shall be made to make a comparison with the Drawings and Specifications and to examine the conditions under which work is to be performed. Ascertain and check all conditions which may affect this work. No allowance shall subsequently be made for any extra expense which may be required due to failure or neglect to make such examination.
B. Drawings
1. The Drawings which constitute a part of this Contract indicate the general arrangement of ducts and locations of apparatus. Should it be necessary to deviate from arrangement indicated in order to meet structural conditions, such deviations shall be made without expense to the Owner.
2. Extreme accuracy of data given herein and on the Drawings is not guaranteed. The Drawings and Specifications are for the assistance and guidance of the Contractor, and exact locations, distances and levels will be governed by the building site. The Contractor shall take his Contract with this understanding.
3. In any case where there appears to be a discrepancy in the Drawings and Specifications, the Contractor shall figure the most expensive alternative and after award of the Contract shall secure directions from the Architect.

C. Manufacturer's Directions: Manufacturer's directions shall be followed in all cases where manufacturers of articles used in this Contract furnish directions covering points not shown on the Drawings and specified herein.

D. Regulations: All work and materials shall be in full accordance with the latest rules of the National Board of Fire Underwriters, any local or state ordinances, the State of California Industrial Accident Commission's Safety Orders, and the regulations of the State Fire Marshal, and with any prevailing rules and regulations pertaining to adequate protection and/or guarding of any moving parts or otherwise hazardous locations. Regulations included in building codes, plumbing codes and all other codes having jurisdiction shall also be followed. Whenever the Drawings and Specifications require larger sizes or higher standards than are required by the regulations, the Drawings, and Specifications shall govern; wherever the Drawings and Specifications shall violate the Regulations, the Regulations shall govern.

E. Permits, Fees, and Inspections: All permits, fees, and inspections required by local authorities shall be arranged for and paid for by this Division. Insofar as they conflict with these requirements, the GENERAL CONDITIONS do not apply to this installation. Properly signed certificates of all final inspections required by local authorities must be furnished to the Owner before the work will be accepted.

F. Cooperation with other crafts in putting the installation in place at a time when space required is accessible, and in such a manner that all other work in the space may be installed as shown on the Drawings. The general arrangement and location of ductwork, apparatus, etc. is shown on the Drawings or herein specified. Minor changes may be necessary to accommodate other work that may conflict with this work, such as electrical, plumbing, etc. Install this in harmony with these, making any minor changes that may be necessary without cost to the Owner.

1.4 SUBSTITUTION OF MATERIALS AND EQUIPMENT

A. Equipment of lesser range and ultimate capacity than the specified equipment will not be considered for substitution. This Division shall bear the burden of proof of the capacity and quality of the equipment for substitution. Complete engineering calculations including appropriate tables, curves, and charts must accompany such items as coils, fans, etc., which are to be considered for
substitution. Substituted equipment without such documents will not be considered.

B. When substituted equipment or material requires changes in piping, duct connections, arrangement, electrical wiring or other design changes, submit five (5) copies of complete scale drawings showing all necessary changes for approval before proceeding with the installation of any substituted item. Such drawings must be dated, bear a title block, and, when in scale, the scale shall be the same as used on the Contract Drawings.

1.5 SHOP DRAWINGS: Submit six (6) copies to the Architect for approval, within a reasonable time after award of Contract or when called for in ample time to prevent delay in construction, all materials specified hereinafter.

1.6 OPERATION AND MAINTENANCE MANUALS

A. Furnish to the Owner three (3) complete separately bound, sets of operating instructions, including manufacturer's literature of all equipment and controls, covering all items of instruction, operation and maintenance. Final inspection will not be made until these instructions are received. The following items are suggested but not totally inclusive.

1. Unit Heater
2. Exhaust Fans
3. Temperature Control Diagrams and Devices

1.7 AS-BUILT DRAWINGS: At completion of the work, turn over to the Architect one (1) complete set of reproducible drawings incorporating the original drawings and all changes made to the original drawings. Reproducible prints of the original drawings will be provided by the Architect. Make all changes to these reproducible drawings to provide a complete and accurate description and record of all the work as installed.

1.8 GUARANTEE: At completion of the work, furnish the Owner a written guarantee, in triplicate, that work has been performed in accordance with Plans and Specifications and guarantee to replace or repair, to the satisfaction of the Owner, any portion of the new work that fails within a period of one (1) year after final acceptance, provided such failure is due to defects in material or workmanship. Also agree to replace or repair, with like workmanship and materials, any part of the building or equipment installed by other trades but damaged in installing this work. See 01 77 00.

1.9 INSPECTION

A. Engineer of record shall inspect all ducting in the field prior to closure of walls and ceilings.

PART 2 - PRODUCTS

2.1 FLEXIBLE CONNECTIONS AT FANS: Ventfabrics 24-gauge metal edge, 30 oz. Ventglass, or equal, neoprene-coated fiberglass fabric connection.

2.2 TURNING VANES FIXED: Aero/Dyne Co., Type H.E.P. high efficiency profile vanes, or equal. Contractor-made turning vanes will not be accepted. Vane assemblies with
galvanized steel 24-gauge side rails and 26-gauge vanes installed on H.E.P. design centers across full diagonal. Install turning vanes in all square elbows and junctures.

2.3 FLEXIBLE DUCTS: Flexmaster type 4, or approved equal, class 1 flex duct with 1", 3/4 lb. density fiberglass insulation, and polyethylene vapor barrier. Flexible duct shall not exceed 7'-0" and must be installed free from kinks and sharp bends. Flexible duct may be substituted for last 7 feet of duct where space allows.

2.4 GAS FIRED UNIT HEATERS: (UH-1): Reznor model F, or approved equal, unit heater complete with heat exchanger, vertical vent kit, motor contactor, fan, single stage combination gas valves, fan and limit safety controls, 24 volt control voltage transformer, terminal strip contactor, spark ignited intermittent safety pilot, threaded hanger connections and single stage thermostat with fan on/off/auto. Unit heater size and capacity shall be as scheduled on the Drawings. Provide with propane kit.

2.5 EXHAUST FANS: Cabinet Exhaust Fans (E-1 and E-2): Cook model GC, or approved equal, direct drive cabinet fan, complete with housing, fan, motor, backdraft damper, aluminum grille. Size and capacities shall be as scheduled on the drawings. Provide E-1 only under add alternate #3.

2.6 LOUVERS: Ruskin LC6375D, Pottorff, or American Warming, 6" deep operable louver with 18ga. steel drainable blades, 16ga. steel operable blades, electric actuator and 3/4" mesh expanded aluminum screen. Louvers shall have finish as directed by the Architect.

2.7 FLUE AND VENT CONNECTION

A. Flue and Combustion Air Connections for Condensing Furnaces: Provide for gas-piped furnaces. Installation shall comply with the manufacturer's installation guidelines. Provide concentric outlet fittings.

B. Flue shall be installed as per manufacturer's recommendations and in accordance with building codes.

2.13 FLASHINGS: Flash walls, roofs, etc. as detailed or as directed by the Architect.

PART 3 - EXECUTION

3.1 SHEET METAL DUCTS AND MISCELLANEOUS SHEET METAL WORKS

A. All air ducts shall be made up of galvanized sheet steel.

B. Weights and Thickness (Except Where Noted Otherwise on Drawings):

<table>
<thead>
<tr>
<th>Largest Dimension of Duct</th>
<th>U.S. Std. Gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up through 30&quot;</td>
<td>#20</td>
</tr>
</tbody>
</table>

C. Seams and Stiffeners

1. Low Pressure Ducts (2" Static Pressure)
   a. Longitudinal Seams: Flat-crimped Pittsburgh lock.
   b. Transverse Joints: Pocket lock, except where absolutely required by space limitations, use S-drive seams reinforced with flat bars.
Hammer up all joints and seal to make practically airtight on four (4) sides. Tape all transverse joints with 8-oz. canvas soaked in adhesive and pasted neatly over joints. Clean joints before application of strips. Strips shall be mitered and lapped 4" wide for pocket lock seams.

c. Transverse Joints and Stiffeners

<table>
<thead>
<tr>
<th>Largest Dim. of Duct</th>
<th>Size of Joint</th>
<th>Joint Spacing</th>
<th>Joint Reinforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 18&quot;</td>
<td>1&quot;</td>
<td>96&quot;</td>
<td>none</td>
</tr>
<tr>
<td>19&quot; to 36&quot;</td>
<td>1&quot;</td>
<td>60&quot;</td>
<td>none</td>
</tr>
<tr>
<td>37&quot; to 42&quot;</td>
<td>1&quot;</td>
<td>60&quot;</td>
<td>1&quot; x 1/8&quot; Bar</td>
</tr>
<tr>
<td>43&quot; to 48&quot;</td>
<td>1 1/2&quot;</td>
<td>60&quot;</td>
<td>none</td>
</tr>
</tbody>
</table>

D. Round Ductwork (Low Pressure): Prefabricated, machine-wrapped, round duct with a sealed spiral-locked seam, or rectangular with equivalent area or internal insulation constructed as specified hereinbefore. The prefabricated round ductwork shall be of zinc-coated steel in minimum gauges of 26 gauge in sizes through 8" diameter, 24 gauge in sizes 9" through 22" diameter, and 22 gauge for duct 24" diameter and larger.

1. Fittings: Minimum 24 gauge, zinc-coated steel with continuously welded joints.

E. Installation and Fittings

1. Install ducts true to line and grade. Make changes of direction by curved section with inside radius equal to 1 1/2 times duct diameter or square elbows with turning vanes as shown. Where square elbows are definitely shown, radius turns may not be used.

2. Fit square elbows and angular turns or junctions with turning blades.

3. Fixed Turning Vanes: Install in square elbows. Install vanes across full diagonal dimensions of elbows. Vane spaces as shown on the Drawings and their sector length shall encompass full 90 degree of turn. When turning vanes are installed in duct with internal insulation, install 20-gauge hat channels of same depth as insulation and secure vane runners to channel.

4. Transformation Sections: Form with uniformly tapering pieces. Unless shown otherwise on Drawings, taper for duct transformations shall not exceed 15 degrees included angle.

F. Flexible Connections at Fans: Width of flexible connections shall be sufficient to allow one (1) inch of free space between flanged metal collars connected. Fasten to flanged duct and fan connections with bolts. Space bolts approximately 3" apart. Seal connections with mastic as specified for duct seams.

G. Duct Penetrations: Where ducts pass through walls, ceilings and floors, seal around four (4) sides of duct at both sides of wall with 2" x 2" x 20 gauge sheet metal flange collar neatly installed and trimmed to fit tightly to wall and duct. At fire walls, pack space between duct and wall solid with approved insulating material prior to installing collar.

H. Rectangular Duct Supports: Support ductwork from construction with 1" x 16 gauge galvanized strap hangers suspended from overhead basic structure. Fold
strap 1" under bottom of duct and screw straps to each side and bottom of duct with a minimum of three (3) #10 sheet metal screws in each strap.

1. Hangers for Ducts: Spaced not over 96" o.c. for ducts smaller than 18" in larger dimension, 60" centers for ducts 18" to 110". Install one (1) set of hangers at each duct termination and, where required, to hold ducts in position.

2. Each Duct: Supported on at least two (2) sides.

I. Round Duct Supports: Support ductwork from construction by galvanized strap hangers suspended from overhead structure. Provide continuous band, same size as hanger strap, around duct. Strap hangers shall be 1" by 22 gauge for ducts up through 26" diameter, 1" by 18 gauge for ducts 27" through 36" diameter. Hangers shall be spaced at maximum 12'-0" on center or as required. Install hangers at each duct termination and where required to hold ducts in position. Provide intermediate structural supports as required.

J. Access Panels with Felted Edges: Installed in ducts where shown and where required for cleaning and for access to equipment and devices in ducts. Access panels shall be airtight.

K. Duct Connections at Diffusers and Registers: Except where indicated, angular offsets, box connections, and other irregular connections at diffusers and registers are prohibited. Duct branches shall be positioned so that final turn to outlets is exactly aligned with outlet. Where location of diffusers and registers is governed by work in other Divisions, such as integrated ceilings, diffusers and registers shall be set to dimensions taken from Division performing this work.

L. All new ducts and related openings shall be covered or sealed during construction until final system startup.

3.2 ADJUSTING AND TESTING: Before the test run is started, the Contractor shall thoroughly clean all ducts and equipment duct system air inlets for air quantities shown on the Drawings, using the dampers provided in the ducts as far as possible. Adjust the air conditioning units and controls. After the system and controls are tested and adjusted for a normal operating condition, notify the Architect and shall operate the system for one (1) eight-hour day to demonstrate acceptability. Furnish all necessary labor and materials to operate the systems. Electric current will be furnished by the Owner. The final test shall be made at a time acceptable to the Owner. The final and acceptance test shall be made at time acceptable to the Architect and shall be paid for by the Owner as a portion of the Contract price. Should any part of the system or any material or workmanship fail in this test, it shall be rectified and the system made ready for a new test and inspection. The Architect shall then be notified that a new inspection will be called for. The cost of the rectifying of the defective work and/or materials and of the second test and inspection shall be borne by the Contractor, as shall the costs of any further tests and inspection, if required.

3.3 TEMPERATURE CONTROL SYSTEM

A. This division of the work shall supervise, calibrate, and install the entire temperature control system. The entire control system shall be guaranteed for one (1) year and service shall be provided without cost to the owner during this period.
B. Provide a complete wiring diagram of the entire control system, including terminal connections to all equipment, starters, relays, switches, and controllers. Submit five (5) copies of diagrams of the proposed control system with a written explanation of each item. Provide all transformers and relays required for the control system. Mount all controls securely and neatly. The control diagram must be submitted to and approved by the Architect prior to installing any controls.

C. All temperature control devices, control conduit, wiring, and connections shall be furnished and installed under this Division of the work.

D. Temperature Control System: Shall be an electrical/electronic system of automatic controls complete with all room thermostat, relays, switches, controllers, and other accessories required to produce the desired performance of the mechanical systems as indicated on the Drawings and as specified. Details of workmanship used shall conform to the requirements of the manufacturer. All controls mounted exterior to the building shall be watertight construction suitable for operation exposed to weather. Control devices shall be Honeywell, or approved equal. The complete installation of all controls work shall be the complete responsibility of this Division including all wiring connections. The electrical Division shall be hired to run wiring as required.

E. Sequence of Operation
   1. Exhaust Fans
      a. Exhaust Fan E-1: Shall be interlocked with switch on wall.
      b. Exhaust Fan E-2: Shall be interlocked with timer on wall.
   2. Unit Heater UH-1: Shall be energized by a single, heating only, wall mounted setback thermostat.

F. Furnish "As-Built" temperature control diagrams of the entire control system and written description of sequence of operation. Mount diagrams in plastic envelopes in location as directed by the owner.

G. Furnish, install, and connect all control wiring for all voltages as necessary to perform the control functions described herein and/or shown on the Drawings. All wiring shall be in conduit and shall conform to the Workmanship and Wiring Methods Section of the Electrical Specifications.

H. Submit for approval, shop drawings of complete control diagrams and control panel layout showing controls as listed hereinbefore and as shown on the Mechanical and Electrical Drawings. Submit written description of control operation. Submit ten (10) copies to the Architect.

I. The Contractor, before permitting operation of any equipment which is furnished, installed or modified under his Contract, shall review all wiring connections which have an influence on his equipment or work and shall verify that these connections are correct. He shall also satisfy himself that the overload protection devices installed are of the correct type, rating, and setting to properly protect his equipment.

J. The Contractor, by giving permission for the operation of equipment furnished, installed or modified, under his Contract, shall assume
responsibility for the correctness of the electrical connections and protective devices.
3.7 FINAL INSPECTION

A. Set control devices to the following temperatures:
   Thermostats: 70 degrees F. inside dry bulb, heating

B. Adjust temperature control system to maintain a temperature of plus or minus 1 degree F. either side of the set point.

END OF SECTION
COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:

1. Materials and equipment shall be furnished and installed in support of electrical work described in these plans and specifications including but not limited to, raceways, boxes, enclosures, feeders, branch circuiting, supports, terminal cabinets, sleeves, gutters, panels, transformers, switchgear, lighting fixtures, controls, relays, contactors, in order to complete and make fully functional the systems described.

2. Lighting systems, both interior and exterior as shown on the plans and as specified herein, including controls, occupancy sensors, lumen sensors, photocell controls, lamps, dimmers, racks, dimming ballasts, supports, fasteners, straps, and miscellaneous mounting hardware and support structures for such equipment.

3. Electrical and Telephone Utility company site work as required by the serving companies. In no case shall work be completed and covered without the written approval of the serving utility companies both on and off site.

4. Duct banks and raceways for all power and communications systems as shown and/or required. Duct banks shall include all trenching, racking, conduit, concrete, backfill, boxes, pads, substructures required for a fully developed and useable pathway for cables, conductors, as shown on site, etc.

5. HVAC and plumbing electrical: Conduit, conductors and terminations for all line voltage power, line voltage controls and fusible and/or non-fusible safety disconnect switches for HVAC equipment, including but not limited to air conditioners, furnaces, fans, heat pumps, cooling towers, system pumps, condensing units. Provide protective equipment unless otherwise noted, etc. including protective devices.

6. Plumbing Electrical: Conduit, conductors and terminations for plumbing equipment with power requirements including necessary fusible and/or non-fusible safety disconnect devices. Provide motor starters where required unless provided by mechanical specification.

7. Power and Lighting Distribution: Furnish and install power and lighting distribution systems including but not limited to panels, feeders, transformers, branch circuits, devices, fixtures, disconnect switches, contactors, controls, etc. for a complete working system.
8. Data systems infrastructure including all boxes, raceways, dedicated branch circuits, sleeves and penetrations, etc. as described and as shown in plans.
9. Lighting acceptance testing, documentation and completion of required forms as specified in Section 26 56 70, LIGHTING ACCEPTANCE TESTING.
10. Allocation of time to adequately train the Owner on the use and operation of all systems installed within the facility or on the property. Minimum two week advance notice shall be coordinated with the Owner and his representatives. Training shall be as outlined in individual system specifications identified to follow.

B. Related Sections Under Other Divisions:
1. Mechanical Wiring: Control circuit wiring, energy management controls and interlocks for mechanical equipment shall be installed by Mechanical Contractor.
2. Painting of electrical equipment where exposed and required by the Architect to be painted as described elsewhere in the specification.
3. Irrigation System: Provide all line voltage (50 volts or above) connections to irrigation system equipment, time clocks and or powered satellite controls. Coordinate locations of this work with the Landscape Contractor.
4. HVAC Control Raceway: Raceways, boxes, and control wiring for thermostats, temperature sensors and control components specified within the mechanical specifications, shall be furnished and installed as required by Division 25 and installed in accordance with the minimum wiring methods allowed for branch circuit wiring in Division 26 (the DDC systems/EMS systems and components are installed in accordance with Division 25).
5. Smoke Fire Dampers: Coordination with Mechanical plans for exact locations and points of connection for power and fire alarm system connections (power and fire alarm connection shall be by Electrical Contractor).
6. Duct mounted smoke detectors: Coordination with Mechanical plans for exact locations and points of connection for power and fire alarm system connections (power and fire alarm connection shall be by Electrical Contractor).
7. Security System: Shall be installed by Owner’s vendor. Contractor shall provide conduits, boxes, stubs to accessible ceilings, dedicated circuit(s) for alarm panel, access control system (key pads, electric locks), etc. as shown and/or required by the Owner’s vendor.

1.3 SYSTEM DESCRIPTION

A. The electrical plans indicate the general layout and arrangement; the architectural drawings and field conditions shall determine exact locations. Field verify all conditions and modify as required to satisfy design requirements as well as code minimums. Maintain all required working clearances as described in CEC Article 110 as well as other applicable articles.

B. Discrepancies shall be brought immediately to the attention of the Architect for clarification. The Architect shall approve any changes. Prior to rough-in, refer to architectural plans that shall take precedence over electrical plans with respect to locations.
C. Verify all power and communications utility company requirements prior to commencement of utility work. Make proper adjustments to the construction to satisfy the serving utility requirements if they differ from the construction documents. It shall be the Contractor’s responsibility to contact each utility company for obtaining finalized utility design drawings and/or approval, and for scheduling inspection of utility infrastructure installations.

D. Charges imposed by the electric and communications utility companies shall be paid by Owner directly to utility companies.

1.4 SUBMITTALS AND SHOP DRAWINGS

A. Before construction, submit in accordance with the General Conditions of this Specification: A complete list of all materials proposed to be furnished and installed under this section.

B. Manufacturers' specifications, catalog cuts and shop drawings as required to demonstrate compliance with the specifications. Identify specific intended use for each component where submittal may be ambiguous. Submit entire bound submittal at one time; partial submittals will not be accepted. At a minimum, submittals will be required for the following:

1. Site work equipment including ducts, conduits, fittings, concrete manholes, concrete and fiberglass pull, manhole, boxes, vaults, trench racks, accessories, etc.
2. Electrical equipment including disconnects, fuses, raceways, straps and racks, fittings, conductors, boxes, gutters, devices, plates, etc.
3. Panelboard and Meter/Main.
5. Lighting equipment including fixtures, ballasts, lamps, mounting accessories, color charts (where required), etc.
6. Lighting control equipment including low voltage switching system, / accessories, occupancy sensing equipment, time clocks, contactors, photocells, lumen sensors, etc.
7. Constructability review letter/comments for lighting acceptance testing as required by Section 26 56 70, LIGHTING ACCEPTANCE TESTING.
8. Complete system component submittals and shop drawings for:
   a. Fire Alarm System
9. Conduit including all fittings, etc.
10. Wiring and cable, terminations, etc.
11. Fire rating penetration materials, details, etc.

C. The intent of these specifications is to establish a standard of quality for materials and equipment. Therefore, some items are identified by manufacturer or trade name designation. Substitutions shall be subject to the Architect's approval. Samples of the proposed and substitute materials may be required for inspection prior to approval. Costs, if any, for evaluation of substitutions shall be the Contractor's responsibility. The decision of the Architect shall be final. Where the substitution will affect other trades, coordinate all changes with those trades concerned and pay any additional costs incurred by them as a result of this substitution. Approval of substitutions shall
not relieve the Contractor from providing an operational system in accordance with all applicable codes and ordinances.

D. SUPPORTING DEVICES
1. Provide all details of suspension and support for ceiling hung equipment.
2. Where walls, floor, slabs or supplementary steel work are used for seismic restraint locations, details of acceptable attachment methods for ducts, conduit and pipe must be included and approved before the submittals must include spacing, static loads and seismic loads at all attachment and support points.
3. Provide seismic details of seismic restraints and anchors; including number, size and locations for each piece of equipment.

1.5 DELIVERY, STORAGE AND HANDLING
A. Storage of equipment for the job is the responsibility of the Electrical Contractor and shall be scheduled for delivery to the site, as the equipment is required. Damage to the equipment delivered to the site or in transport to the job shall be the responsibility of the Electrical Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS
A. Materials shall be new and bear the label of or be listed by a nationally recognized testing laboratory. The quality and suitability of all materials shall conform to the standards and practices of this trade.

B. Supplied materials shall be of a current manufactured product line. Discontinued products are not acceptable. Where products are identified on the contract documents by part number, supply the current product model or series which meets the specification and intended use of the specified component.

2.2 SUPPORTING DEVICES

B. Concrete Inserts: Kindorf D-255, cast in concrete for support fasteners for loads up to 800 lbs.

C. Pipe Straps: Two-hole galvanized or malleable iron.

D. Luminaire Chain: Campbell Chain 75031, 90-lb. test with steel hooks.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Professionalism and appearance of installations shall be in accordance with accepted practices of this trade. Installation methods shall conform to manufacturers' specifications and recommendations. The Contractor shall man the job with qualified journeymen and helpers in this trade for the duration of the job. It is the Contractor's responsibility to communicate with and keep the job superintendent appraised of changes or clarifications, etc.

B. Employment of any person on any job in the capacity of an electrician is not permitted unless such person has qualified for and holds a valid Journeyman Electrician Pocket Card or General Journeyman Electrician Certificate issued by the State of California Division of Apprenticeship Standards except, Contractor may employ electrical helpers or apprentices on any job of electrical construction, new or existing, when the work of such helpers or apprentices is performed under the direct and constant personal supervision of a journeyman electrician holding a valid Pocket Card accepted by the State of California Division of Apprenticeship Standards.

1. Each Pocket Card carrying journeyman electrician will be permitted to be responsible for the quality of workmanship for a maximum of one helper or apprentice during any same time period, provided the nature of work is such that good supervision can be maintained and the quality of workmanship is the best, as expected by Owner and implied by the latest edition of the National Electrical Code.

2. Before each journeyman electrician commences work, deliver to Owner at the project site, a photocopy of the journeyman's valid Pocket Card.

C. Materials shall be installed in accordance with the manufacturers' specification and recommendations. They must conform to the approval AHJ adopted codes and standards, but not less than the 2013 CEC and all applicable codes and standards, including but not necessarily limited to California Code of Regulations Title 24, NFPA, National Electrical Manufacturers Association, ANSI, CBC, and any other adopted ordinances of applicable agencies having jurisdiction. Refer to general conditions of specifications.

D. Electrical Contractor shall lay work out in advance in order to avoid unnecessary cutting, chasing, and drilling of floors, walls, ceilings and other surfaces. Work of this nature shall be carefully done so as not to damage work already performed by other trades. Any damage which results must be properly repaired at no extra cost to the Owner. Such alterations shall not depreciate the integrity of the structure. Approval for cuts or penetrations in structural members shall be by the Architect.

E. Supporting Devices:

1. Verify mounting height of all luminaires or items prior to installation when heights are not detailed.

2. Install vertical support members for equipment and luminaires, straight and parallel to building walls. Provide independent supports to structural member for
electrical luminaires, materials, or equipment installed in or on ceiling, walls or in void spaces or over furred or suspended ceilings.

3. Do not use other trade’s fastening devices as supporting means for electrical equipment, materials or luminaires. Do not use supports or fastening devices to support other than one particular item.

4. Support conduits within 18” of outlets, boxes, panels, cabinets and deflections. Maximum distance between supports not to exceed 8’ spacing.

5. Securely suspend all junction boxes, pull boxes or other conduit terminating housings located above suspended ceiling from the floor above or roof structure to prevent sagging and swaying.

6. Provide seismic bracing per UBC requirements for this building location.

7. Supporting Devices: Safety factor of 4 required for every fastening device or support for electrical equipment installed. Support to withstand four times weight of equipment it supports. Bracing to comply with seismic design category “SDC” per Structural Engineer.

F. Coordinate work with other trades as required to eliminate any delays during construction. Coordinate changes with other prime contractors to avoid construction conflicts.

G. Engineer’s Field Observation: Site visits during construction for field observations and reports will be conducted by electrical engineer when directed by the Architect. A list of items that need to be addressed will be submitted to the Architect for forwarding to the Contractor. A written response to all items shall be submitted for Owner’s review once complete. When Electrical Engineering representative performs a field observation, the Electrical Contractor shall be present and available to remove equipment covers as needed.

H. Drawings of Record: Provide a full and accurate set of field record drawings marked up in a neat and understandable manner submitted to the Owner Representative, Construction Manager, or Architect upon completion of the work and prior to issuance of a certificate of completion. The drawings shall dimension all electrical facilities including but not limited to underground conduit, vaults, boxes as well as conduit routing scaled to within 12” of actual field conditions and shall be kept up to date on a daily basis reflecting changes or deviations. Electrical facilities shall be accurately drawn on the plan to scale. Refer to the general conditions of these specifications for additional requirements. Record drawings shall be required to identify both horizontal and vertical dimensions to visible and fixed points such as concrete, asphalt, buildings, sidewalks, etc.

I. Identification: Provide engraved laminated plastic nameplates for all switchboards, panelboards, fire alarm terminal cabinets, telephone and cable television backboards, main devices, control panels, time clocks, contactors and safety disconnect switches accurately identifying each device. Labels shall be attached to the equipment by means of screws or rivets. Self-adhering labels will not be acceptable. Refer to Section 26 05 53, IDENTIFICATION OF ELECTRICAL SYSTEMS.

J. Safety: The Electrical Contractor is responsible to maintain equipment in a safe and responsible manner. Keep dead front equipment in place while equipment is energized. Conduct construction operations in a safe manner for employees as well as
other work persons or anyone visiting the job site. Provide barriers, trench plates, flags, tape, etc. The Contractor shall hold all parties harmless of negligent safety practices that may cause injury to others on or near the job site.

K. Guarantees: Equipment and labor shall be guaranteed and warranted free of defects, unless otherwise stated to be more restrictive, for a period of one year from the date of final acceptance by the Owner. A written warranty shall be presented to the Architect at the time of completion prior to final acceptance. Equipment deemed to be damaged, broken or failed should be repaired or replaced at no additional cost to the Owner. Materials or system requiring longer than a one-year warranty as described herein shall be separately warranted in separate letters of guarantee stating the duration of warranty.

L. Operating and Installation Manuals: Provide two copies each of manuals, operating and installation instructions for equipment indicated in submittal packages. Instruct the Owner's representative as to the operation and location of equipment necessary to allow them to operate the facility upon final acceptance. This instruction period shall be prearranged with the Owner's representative prior to occupancy of the facility and the weeks prior to training scheduled.

M. Lighting Acceptance Testing: Provide two copies of lighting acceptance testing results and equipment operating manuals as specified in Section 26 56 70, LIGHTING ACCEPTANCE TESTING. Instruct the Owner on operation of control systems.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Wires and cables.
2. Connectors.
3. Lugs and pads.
4. MC cable (not allowed).

1.3 SYSTEM DESCRIPTION

A. Provide wires, cables, connectors, lugs, strain reliefs, racking insulators for a complete and operational electrical system.

1.4 SUBMITTALS

A. Provide product data for the following equipment:
1. Wires.
2. Cables.
3. Connectors.
4. Lugs.
5. Splice Kits.
6. Strain Relief Fittings.
7. Cable Racking and Insulators.

B. Provide the insulation cable testing report in the project closeout documentation, refer to Closeout Requirements in the General Conditions portion of this specification.

1.5 REGULATORY REQUIREMENTS

A. Conform to requirements of the CEC, latest adopted version with amendments by local Authority Having Jurisdiction (AHJ).

B. Furnish products listed by UL or other testing firm acceptable to AHJ.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Wires and Cables: General Cable, Okonite, Southwire, or approved equal.

B. Connectors: Burndy, Ilsco, Thomas & Betts, or approved equal.

C. Wire connectors shall be minimum 75 degree centigrade rated and properly sized for the number of conductors being connected, terminated, spliced etc. All above grade connectors shall be solderless lug or plastic wire nut type, screw on, pressure cable type (wire nut or spring nut type), 600 volt, 105 degree C, with skirt to cover all portions of stripped wires. Connector shall be U.L. rated for number and size of conductors being joined together as a splice.

D. Splices:
   1. Branch Circuit Splices: Ideal, Scotch-Lock, 3M, or approved.
   2. Feeder Splices: Compression barrel splice with two layers Scotch 23 and four layers of Scotch 33+ as vapor barrier plus 3M cold Shrink.
   3. Screw Terminal Lugs.

2.2 WIRES AND CABLES FOR LINE VOLTAGE SYSTEM AND CONTROLS. WIRE AND CABLE SHALL BE:

A. Copper, 600 volt rated throughout. Conductors 14AWG to 10AWG, solid or stranded. Conductors 8AWG and larger, stranded.

B. Phase color to be consistent at all feeder terminations; A-B-C, top to bottom, left to right, front to back. Phasing tape shall be permitted on sizes #6 and larger.

C. Color Code Conductors as Follows:
   PHASE  208 VOLT
   A.    Black
   B.    Red
   C.    Blue
   Neutral White
   Ground Green

D. All conductors shall be copper unless otherwise noted. Minimum size for individual conductors shall be #12 AWG unless otherwise noted. Sizes #8 AWG and larger shall be stranded conductor. Individual conductors shall be insulated with type, XHHW, THW, THHN/THWN 600-volt insulation unless otherwise noted. Control, signal, communication conductors shall be as dictated by the vendor of that equipment or as specified here-in. Proper insulation type shall be used for the proper environmental application (i.e., waterproof, wet location, plenum, temperature rated). If a condition exists where the application is uncertain, contact the Engineer for direction. Contractor is responsible to follow specific cabling requirements described in other sections of this specification relative to various communications and controls systems as well as the
respective riser diagrams shown on plans. If a discrepancy occurs, communicate such discrepancy to the Architect and Engineer immediately for resolution.

E. Insulation types THWN, THHN or XHHW. Minimum insulation rating of 90C for branch circuits.

F. Refer to signal and communications specification sections for cable requirements.

2.3 CONNECTORS

A. Copper Pads: Drilled and tapped for multiple conductor terminals.

B. Lugs: Indent/compression type for use with stranded branch circuit or control conductors.

C. Solid Conductor Branch Circuits: Spring connectors, wire nuts, for conductors 18 through 8AWG.

2.4 LUGS AND PADS

A. Ampacity: Cross-sectional area of pad for multiple conductor terminations to match ampere rating of panelboard bus or equipment line terminals.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation: Conductors shall not be installed until after conduit systems are permanently in place. Use an approved non hardening type wire pulling lubricant if lubricant is to be used. Maintain all conduits and wire pulls free from foreign material. If due to field conditions, more than a total of 360 degrees of bend are required; a pull box shall be furnished and installed for ease of installation. Said pull boxes must be sized and rated for the appropriate application and must remain easily accessible upon completion of the project (approval of the location shall be obtained from the Architect prior to installation). Show these pullboxes on the field record drawings. Conductors installed in underground raceways on site shall be duct sealed and taped where they exit the raceway to prevent the entrance of foreign material and moisture after the conductors are installed. Proper drainage shall be provided for underground pull and splice boxes.

B. Insulation: Use proper insulation types where temperature and environment are a factor.

C. Splices at or below grade level shall be made with wet location rated and approved mechanical connectors and shall be encapsulated in epoxy or plastic molded poured kits. The connections must be assured to be watertight. Splices at or below grade shall always be avoided and minimized. Prior approval is required for feeder splices.
below grade. Submit proposed materials and exhibit showing location of intended splices for Engineer's review and approval prior to commencing with the work.

D. Labeling: All conductors in panels, switchboards, terminal cabinets, vaults, pull boxes, and junction boxes shall be labeled with tape number markers indicating circuit number and identifying system. All labeling shall be permanent. In manholes and vaults, provide embossed brass tags identifying system serviced and function. See Section 26 05 53 IDENTIFICATION OF ELECTRICAL SYSTEMS.

E. All conductors, wiring, cable where installed below floor, slab or underground shall be considered wet locations, and shall be rated accordingly. Non waterproof cabling is not allowed in any below grade or wet application.

F. Cables routed together in cable tray shall be stacked, organized and tie wrapped together in a neat and workman like manner. Random cable routing is not acceptable.

G. Cable and conductors routed through pull boxes and vaults shall be properly supported on porcelain or equal insulators mounted on steel rack inserts. Bend radius of cable or conductor shall not be less than six times the overall cable diameter.

H. Wires and Cables:
   1. Conductor Installation:
   a. Install conductors in raceways having adequate, code size cross-sectional area for wires indicated.
   b. Install conductors with care to avoid damage to insulation.
   c. Do not apply greater tension on conductors than recommended by manufacturer during installation.
   d. Use of pulling compounds is permitted. Clean residue from exposed conductors and raceway entrances after conductor installation.
   2. Conductor Size and Quantity:
   a. Install no conductors smaller than 12AWG unless otherwise shown.
   b. Provide all required conductors for a fully operable system.
   3. Provide dedicated neutrals (one neutral conductor for each phase conductor) in the following single phase circuits:
   a. Dimmer controlled circuits.
   b. 120v branch circuits.
   c. Ground fault and arc fault protected circuits where a GFI and arc fault breakers are used in panelboards.
   d. Other electronic equipment which produces a high level of harmonic distortion including but not limited to computers, printers, plotters, copy machines, fax machines, where indicated.
   4. Conductors in Cabinets:
   a. Cable and train all wires in panels and cabinets for power and control neatly and uniformly. Use plastic ties in panels and cabinets.
   b. Tie and bundle feeder conductors in wireways of panelboards.
   c. Hold conductors away from sharp metal edges.
   d. Connectors: Retighten mechanical type lugs and connectors for conductors to equipment prior to Notice of Completion.
3.2 FIELD QUALITY CONTROL

A. Tests:
   1. Test conductor insulation on feeders of 400 amp and greater for conformity with
      1000 volt megohmmeter. Use Insulated Cable Engineers Association testing
      procedures. Minimum insulation resistance acceptable is 1 megohm for systems
      600 volts and below.

   2. Test Report: Prepare a typed tabular report indicating the testing instrument, the
      feeder tested, amperage rating of the feeder, insulation type, voltage, the
      approximate length of the feeder, conduit type, and the measured resistance of
      the megohmmeter test. Submit report with operating and maintenance manual.

END OF SECTION
SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:
1. Grounding and bonding requirements of electrical installations for personnel safety and to provide a low impedance path for possible ground fault currents as described in CEC Article 250.
2. The terms “connect” and “bond” are used interchangeably in this specification and have the same meaning.

B. Related Work:
1. Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.
2. Section 26 05 19, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES.

PART 2 - PRODUCTS

2.1 GROUNDING AND BONDING CONDUCTORS

A. Equipment grounding conductors shall be UL 83 insulated stranded copper, except that sizes No. 10 AWG and smaller shall be solid or stranded copper. Insulation color shall be continuous green for all equipment grounding conductors, except that wire sizes No. 4 AWG and larger shall be permitted to be identified per CEC.

B. Bonding conductors shall be ASTM B8 bare stranded copper, except that sizes No. 10 AWG and smaller shall be ASTM B1 solid bare copper wire.

C. Conductor sizes shall not be less than what is shown on the drawings and not less than required by the CEC, whichever is greater.

2.2 GROUND RODS

A. Copperclad steel, 5/8" diameter by 8' long, conforming to UL 467 unless otherwise noted on drawings and details.
B. Quantity of rods shall be as required to obtain the specified ground resistance or additional rods shall be driven to obtain specified resistance or less.

2.3 SPLICES AND TERMINATION COMPONENTS
A. Components shall meet or exceed UL 467 and be clearly marked with the manufacturer, catalog number, and permitted conductor size(s).

PART 3 - EXECUTION

3.1 GENERAL
A. Ground in accordance with the CEC, as shown on drawings, and as hereinafter specified.
B. System Grounding:
   1. Secondary service neutrals: Ground at the supply side of the secondary disconnecting means and at the related transformers.
   2. Separately derived systems (transformers downstream from the service entrance): Ground the secondary neutral.
C. Equipment Grounding: Metallic structures (including ductwork and building steel), enclosures, fire sprinklers, plumbing piping, raceways, junction boxes, outlet boxes, cabinets, machine frames, and other conductive items in close proximity with electrical circuits shall be bonded and grounded.

3.2 INACCESSIBLE GROUNDING CONNECTIONS
A. Make grounding connections which are buried or otherwise normally inaccessible (except connections for which periodic testing access is required) by exothermic weld.

3.3 SECONDARY EQUIPMENT AND CIRCUITS
A. Main Bonding Jumper: Bond the secondary service neutral to the ground bus in the service equipment.
B. Metallic Piping, Building Steel, and Supplemental Electrode(s):
   1. Provide a grounding electrode conductor sized per CEC between the service equipment ground bus and all metallic water and gas pipe systems, building steel, and supplemental or made electrodes. Jumper insulating joints in the metallic piping. All connections to electrodes shall be made with fittings that conform to UL 467.
   2. Provide a supplemental ground electrode and bond to the grounding electrode system.
C. Service Disconnect: Provide a ground bar bolted to the enclosure with lugs for connecting the various grounding conductors.

D. Switchboard:
   1. Connect the various feeder equipment grounding conductors to the ground bus in the enclosure with suitable pressure connectors.
   2. For service entrance equipment, connect the grounding electrode conductor to the ground bus.
   3. Connect metallic conduits, which terminate without mechanical connection to the housing, by grounding bushings and grounding conductor to the equipment ground bus.

E. Conduit Systems:
   1. Ground all metallic conduit systems. All metallic conduit systems shall contain an equipment grounding conductor sized per CEC.
   2. Non metallic conduit systems shall contain an equipment grounding conductor, except that non-metallic feeder conduits which carry a grounded conductor from exterior transformers to interior or building-mounted service entrance equipment need not contain an equipment grounding conductor.
   3. Metal conduit containing only a grounding conductor, and which is provided for mechanical protection of the conductor, shall be bonded to that conductor at the entrance and exit from the conduit.

F. Feeders and Branch Circuits: Install equipment grounding conductors with all feeders, power and lighting branch circuits.

G. Boxes, Cabinets, Enclosures, and Panelboards:
   1. Bond the equipment grounding conductor to each pullbox, junction box, outlet box, device box, cabinets, and other enclosures through which the conductor passes.
   2. Provide lugs in each box and enclosure for equipment grounding conductor termination.
   3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs to terminate the equipment grounding conductors.

H. Motors and Starters: Provide lugs in motor terminal box and starter housing or motor control center compartment to terminate equipment grounding conductors.

I. Receptacles shall not be grounded through their mounting screws. Ground with a jumper from the receptacle green ground terminal to the device box ground screw and the branch circuit equipment grounding conductor.

J. Ground lighting fixtures to the equipment grounding conductor of the wiring system when the green ground is provided; otherwise, ground the fixtures through the conduit systems. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.

K. Fixed electrical appliances and equipment shall be provided with a ground lug for termination of the equipment grounding conductor.
L. Panelboard Bonding: The equipment grounding terminal buses of the normal and emergency branch circuit panelboards shall be bonded together with an insulated continuous copper conductor not less than No. 8 AWG where panels are in the same room together or within 25’ of each other. These conductors shall be installed in rigid metal conduit.

3.4 CONDUCTIVE PIPING

A. Bond all conductive piping systems, interior and exterior, to the building to the grounding electrode system. Bonding connections shall be made as close as practical to the equipment ground bus.

3.5 GROUND RESISTANCE

A. Grounding system resistance to ground shall not exceed 25 ohms. Make necessary modifications or additions to the grounding electrode system for compliance without additional cost to the Owner. Final tests shall assure that this requirement is met and test results shall be submitted to the Owner with final close out documents.

B. Resistance of the grounding electrode system shall be measured using a four-terminal fall-of-potential method as defined in IEEE Standard 81. Ground resistance measurements shall be made before the electrical distribution system is energized and shall be made in normally dry conditions not less than 48 hours after the last rainfall. Resistance measurements of separate grounding electrode systems shall be made before the systems are bonded together below grade. The combined resistance of separate systems may be used to meet the required resistance, but the specified number of electrodes must still be provided.

C. Services at Pacific Gas and Electric Company interface point shall comply with their ground resistance requirements.

D. Below-grade connections shall be visually inspected by the IOR prior to backfilling. The Contractor shall notify the IOR 24 hours before the connections are ready for inspection.

E. Furnish a copy of tests to Owner at completion of project.

3.6 GROUND ROD INSTALLATION

A. Drive each rod vertically in the earth, not less than 7 1/2’ in depth.

B. Where permanently concealed ground connections are required, make the connections by the exothermic process to form solid metal joints. Make accessible ground connections with mechanical pressure type ground connectors.

C. Where rock prevents the driving of vertical ground rods, install angled ground rods or grounding electrodes in horizontal trenches to achieve the specified resistance.
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Hangers and supports for electrical equipment and systems.
   2. Construction requirements for concrete bases.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.
B. IMC: Intermediate metal conduit.
C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 ACTION SUBMITTALS

A. Product Data: For the following:
   1. Steel slotted support systems.
2. Nonmetallic slotted support systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
   1. Trapeze hangers. Include Product Data for components.
   2. Steel slotted channel systems. Include Product Data for components.
   3. Equipment supports.

1.6 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.7 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70.

1.8 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified together with concrete Specifications.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Allied Tube & Conduit.
      b. Cooper B-Line, Inc.; a division of Cooper Industries.
      c. ERICO International Corporation.
      d. GS Metals Corp.
      e. Thomas & Betts Corporation.
      f. Unistrut; Tyco International, Ltd.
      g. Wesanco, Inc.
   2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
3. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
4. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
   1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
      a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
         1) Hilti Inc. or equal.
   2. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
   3. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
   4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
   5. Toggle Bolts: All-steel springhead type.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Section 05 50 00 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
   1. Secure raceways and cables to these supports with two-bolt conduit clamps.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
   1. To Wood: Fasten with lag screws or through bolts.
   2. To New Concrete: Bolt to concrete inserts.
   3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
   4. To Existing Concrete: Expansion anchor fasteners.
   5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
   6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
   7. To Light Steel: Sheet metal screws.
   8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Section 05 50 00 "Metal Fabrications" for site-fabricated metal supports.
B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.

B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 03 30 00 "Cast-in-Place Concrete."

C. Anchor equipment to concrete base.
   1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   2. Install anchor bolts to elevations required for proper attachment to supported equipment.
   3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
   1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION
SECTION 26 05 33
RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Conduit and fittings.
2. Outlet boxes.
3. Weatherproof outlet boxes.
5. Cabinets, termination cabinets.
6. Concrete boxes and vaults.

B. Related Work:
1. Installation of all wire, cable, conductor, boxes/gutters, pull ropes, fiber optic cable raceway, conduit, innerduct, cable sleeve and duct as described on the plans and/or as specified here-in. This scope shall include pathways to be installed underground on site and offsite, underslab, above grade, both concealed and exposed, overhead concealed and exposed as appropriately applied. Raceways/boxes shall be installed in accordance with their intended and allowed uses and as specified here-in whichever is more restrictive. Size and capacity of all raceway/boxes shall be as specified here-in or as depicted on the drawings, but shall not be less than that required by code. Larger raceway sizes may be specified than code would permit. The specifications shall govern.
2. Listed products for termination, coupling, extending, benching supports of raceways shall be used.
3. Raceways/boxes described by this section shall include, but not be limited to, power for site utilities and lighting, site and building communications, controls, fire alarm, security, access control, sound systems, data system, energy management systems, power distribution, lighting, lighting controls, video, CATV, voice communications, intercom, nurse call, HVAC and other building low voltage/communications systems controls as may be required. Raceways, boxes and duct paths required for utility companies shall be installed per plans unless utility company requirements are more restrictive at which time those requirements shall take precedence.
4. Protection of and cleanliness of pathways and raceways must be assured during the construction process in order to eliminate the possibility of debris entering the conduit, duct, pathway resulting in decreased wire capacity and potential damage to installed conductors and cables.
5. Pathways are shown in a diagrammatic way and are generally accurate as to routing, however, it is the Contractor's responsibility as a means and methods process to coordinate with all other trades that require space within a building. The Contractor shall obtain approval for installation of raceways routing through structural footings, retaining walls, columns, beams, perlins, grade beams, etc.

6. It is the Contractor's responsibility to insure that all raceway and boxes systems penetrate fire assemblies and sound rated assemblies in an approved manner using the appropriate and listed products for the purpose.

7. Trenching and backfilling for all underground conduit systems installed by the Electrical Contractor shall be the responsibility of the Contractor. Conduits shall have minimum cover requirement of 36” below finish grade with the exception of site lighting conduits which may be 24” below finish grade minimum. More stringent depth requirements may be imposed by the local agency and shall be adhered to, and / or this specification or as detailed on the plans. Joint trenching may be utilized where practicable and where permitted by this specification. Concrete, native material and sand shall be used as backfill material and shall be compacted in accordance with and coordinated with the grading and site preparation requirements. Conduits shall rest in a minimum of 4" bed of sand prior to backfill and compaction. Locations of existing underground (UG) utility systems shall be determined by calling Underground Service Alert (USA) at least 48 hours prior to any excavation.

8. Minimum conduit size shall be 1/2" except if plan shows or code requires larger size. Exception: Use minimum 3/4" for underslab and below grade applications outside of building exterior walls.

9. All electrical, control, communications systems shall be installed in metallic conduit system. This shall include but not be limited to all systems described in Section B.3 above, except for voice and data systems which shall be installed as described on these plans and as specified here-in but shall not be less than the recommendations of EIA/TIA standards.

10. All line voltage wiring within the building shall be installed in metallic conduit.

11. All conduit, concrete pads, underground concrete or fiberglass substructures shall be furnished and installed with the approved materials and type for the application. Provide proper traffic control during construction as well as barriers and protection of all excavations and trenching.

12. Empty or future conduits shall be properly plugged with plastic caps or inserts with a 3/8" polyethylene pull rope. Plastic or "duct" tape will not be acceptable.

13. Exterior installations: After conductors are installed, seal conduit ends to prevent entrance of foreign material using pliable duct seal, caps or waterproof expanding foam.

14. All low voltage systems including intercom, fire alarm, public address, etc. shall be in dedicated conduit systems. It shall be the contractor’s responsibility to provide raceway down walls to outlet boxes and to provide sleeves across inaccessible ceiling spaces.

15. Underground conduits entering building shall have the open end of conduit within building above the elevation of the conduit outside the building such that water cannot enter building through conduit. If such a condition exists, a pull box outside of building footprint shall be installed in conduit route before conduit enters building whereby top of pull box is below finish floor of building and moisture may exit box before entering building.

16. No single conduit run of any type shall exceed 300 degrees of radius bend from termination box to termination box.
17. Separate Raceway System: Provide a separate dedicated raceway system for each system installed, do not combine different systems into a raceway or cable tray system, unless otherwise noted or allowed.

18. Spare, Future Conduits: Conduits labeled conduit only, spare, or for future use, shall be provided with a pullrope, capped at each end, labeled as spare with destination marked, and turned over to the Owner in an unused state. Contractor shall not utilize these conduits for the installation of cabling or conductors as part of this scope of work. Contractor to verify and install at no additional cost to the Owner, additional conduits as required for the installation of the systems being installed.

19. Outlet System: Provide electrical boxes and fittings as required for a complete installation. Including but not limited to outlet boxes, junction boxes, pull boxes, bushings, locknuts, covers and all other necessary components.

20. Code Compliance: Comply with CEC as applicable to construction and installation of electrical boxes and fittings and size boxes according to CEC 312, 314 and 366 except as noted otherwise.

21. Outlets to be flush mounted: Maintain integrity of insulation and vapor barrier. Unless otherwise noted, flush mount all outlet boxes.

22. Provide putty pads of proper type around outlet boxes and/or as detailed on plan to meet sound transmission restrictions and fire ratings of walls.

1.3 SUBMITTALS

A. Provide Shop Drawings and Product Data for the Following Equipment:
   1. Conduit and fittings.
   2. Outlet boxes.
   3. Weatherproof outlet boxes.
   5. Cabinets, termination cabinets.
   6. Concrete boxes and vaults.
   7. Fiberglass or composite boxes and vaults.
   8. Putty pads.
   9. Raceways

1.4 REGULATORY REQUIREMENTS

A. Conform to requirements of the CEC, latest adopted version with amendments by local AHJs.

B. Furnish products listed by UL or other independent and nationally recognized testing firm.
PART 2 - PRODUCTS

2.1 MATERIALS

A. Heavy wall Rigid Non-Metallic Conduit, shall be PVC schedule 40 manufactured in accordance with NEMA Standard TC-2, UL-651 and WC 1094A specifications.

B. Extra heavy wall non-metallic conduit, shall be PVC schedule 80 manufactured in accordance with NEMA Standard TC-2, UL-651 and WC 1094A specifications.

C. Galvanized Rigid Steel (GRS) conduit shall be hot dipped galvanized, zinc coated and shall comply with Underwriters Laboratories UL-6, ANSI Specification C-80.1 and Federal Specification WW-C-581E.

D. Electrical Metallic Tubing (EMT) shall be zinc coated, with a protective coating applied to the inside surface and shall comply with Underwriter Laboratories UL-797 ANSI Specification C-80.3 and Federal Specification WW-C-563A.

E. Flexible Metal Conduit (FMC) shall be continuous wound reduced wall galvanized steel produced to UL standards.

F. Liquid tight flexible metal conduit shall have a thermoplastic cover over a galvanized steel core containing an integral copper ground in sizes to 1 1/4" and shall be in compliance with UL standards and CEC Article 350.

G. Manufacturers:
   1. Outlet Boxes: Bowers, Raco, Steel City or equal.
   2. Weatherproof Outlet Boxes: Bell, Red Dot, [Carlon] or equal.
   4. Box Extension Adapter: Bell, Red Dot, [Carlon] or equal.
   5. Conduit Fittings: O-Z Gedney, Thomas & Betts, or equal.
   7. Putty pads: 3M, Hilti, or equal.
   8. Heavy wall rigid non-metallic conduit, Carlon, Certainteed, R&G Sloane or equal.
   9. Extra heavy wall non-metallic conduit, Carlon, Certainteed, R&G Sloane or equal.
   10. Galvanized Rigid Steel (GRS) conduit shall be hot dipped galvanized, zinc coated and shall comply with Underwriters Laboratories UL-6, ANSI Specification C-80.1 and Federal Specification WW-C-581E.
   11. Electrical Metallic Tubing (EMT) shall be zinc coated, with a protective coating applied to the inside surface and shall comply with Underwriter Laboratories UL-797 ANSI Specification C-80.3 and Federal Specification WW-C-563A.
   12. Flexible Metal Conduit (FMC), Alflex, American Flexible Conduit or equal.
   13. Liquid tight flexible metal conduit, Anacanda (type UA), Electri-flex Liquatite or equal.
   14. Surface mount raceway, Wiremold, Three Compartment Series 5500 or equal.
   15. Wire basket tray, B-line, GS Metals, Cablofil or equal.
   16. Cable runway tray, B-line, CPI, Homaco or equal.
   17. Masonry Boxes, outlets in concrete, Raco Series 690 or equal.
2.2 OUTLET BOXES

A. NEMA 1 gutter, junction and pull boxes shall be fabricated from code gage steel finished in grey enamel with screw cover fronts and concentric knockouts in all sides.

B. NEMA 3R gutter, junction and pull boxes shall be fabricated from code gage galvanized steel with screw cover fronts and concentric knockouts in the bottom only. Any penetrations to the side, top or back shall be weatherproofed in an approved manner such as “MYERS” gasketed type hub or equal.

C. Steel outlet boxes and plaster rings shall be galvanized rigid assemblies, either one piece pressed or factory welded construction containing the size and number of knockouts required. Steel outlet boxes shall be manufactured, sized and installed in accordance with CEC Article 314. Device Outlet: Installation of one or two devices at common location, minimum 4” square, minimum 2 1/8” deep. Single or 2 gang flush device plaster ring. Raco Series 681 and 686 or equal.

D. Luminaire Outlet: minimum 4” square with correct plaster ring depth, minimum 2 1/8” deep with 3/8” luminaire stud if required. Provide proper depth plaster ring on bracket outlets and on ceiling outlets.

E. Multiple Devices: Three or more devices at common location. Install 1 piece gang boxes with 1 piece device plastering. Install one device per gang unless otherwise allowed.

F. Construction: Provide galvanized steel interior outlet wiring boxes, of the type, shape and size, including depth of box, to suit each respective location and installation; constructed with stamped knockouts in back and sides, and with threaded holes with screws for securing box covers or wiring devices. Boxes shall be properly secured to the structure such that they are flush with the finish surface. Boxes shall be made structurally secure by means of the proper fastening devices.

G. Accessories: Provide outlet box accessories as required for each installation, including mounting brackets, wallboard hangers, extension rings, plaster rings, luminaire studs, cable clamps and metal straps for supporting outlet boxes, compatible with outlet boxes being used and meeting requirements of individual wiring situations.

2.3 WEATHERPROOF OUTLET BOXES

A. Cover plates on outlet boxes mounted flush in the wall shall be gasketed to the wall in a watertight manner. Weatherproof boxes in wet locations as described in CEC 406.8 (B) shall be provided with a “while-in-use” cover; red dot ‘CK’ Series of aluminum die-cast construction, NEMA 3R, with lacquer finish.

2.4 JUNCTION AND PULL BOXES

A. Construction: Provide galvanized sheet steel junction and pull boxes, with screw-on covers; of the type shape and size, to suit each respective location and installation; with welded seams and equipped with steel nuts, bolts, screws and washers.
B. Location:
1. Install junction boxes above accessible ceilings for drops into walls for receptacle outlets from overhead.
2. Install junction boxes and pull boxes as required to facilitate the installation of conductors and limiting the accumulated angular sum of bends between boxes, cabinets and appliances to 360 degrees.
3. Locations: Junction boxes shall be located only where necessary and only in equipment rooms, closets, and accessible attic and underfloor spaces. A horizontal distance of 24” shall separate outlet boxes on opposite sides of occupancy separation walls, fire-rated walls or partitions.
4. Labeling: Junction box covers shall be marked with indelible ink indicated the circuit numbers passing through the box.

2.5 BOX EXTENSION ADAPTER

A. Construction: Diecast aluminum.

B. Location: Install over flush wall outlet boxes to permit flexible raceway extension from flush outlet to fixed or movable equipment.

2.6 CONDUIT FITTINGS

A. Requirements: Provide corrosion-resistant punched-steel box knockout closures, conduit locknuts and plastic conduit bushings of the type and size to suit each respective use and installation.

B. Steel boxes may allow for field knock-out modifications, but shall in all other ways conform to code requirements.

2.7 EXTERIOR IN-GRADE BOXES FOR NON-UTILITY COMPANY USE SHALL BE:

A. Precast concrete or polymer concrete type with full bottoms and draining into gravel drywell. Open bottom splice/pull boxes 24” x 36” and smaller shall be open bottom, with minimum 12” of gravel below for drainage.

B. Flushmount in hardscape and 1” above grade in softscape.

C. Provided with correct traffic type lid, i.e., full vehicular, intermediate incidental vehicular or pedestrian-rated as applicable stamped with “ELECTRIC”, “LIGHTING”, COMMUNICATIONS”, etc. cover identification as shown on the drawings or as applicable. All boxes or vaults located in streets, driveways, sidewalks wider than 8’, and turf areas where mowing takes place shall be traffic rated.

D. Provided with brass hold-down bolts in cover.

E. Provided with necessary box extensions to gain proper depth.
F. Seal all conduit in underground boxes with duct seal after conductors have been installed.

2.8 IN-GRADE UTILITY COMPANY BOXES AND VAULTS

A. In-grade boxes and pads for utility company, shall be as specified by the respective utility company with all of the company’s requirements and construction methods met.

2.9 PUTTY PADS

A. Intumescent moldable firestop putty designed to protect electrical outlet boxes.

B. Designed to install around outside of outlet boxes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Conduit systems listed below are for use in installations where they are permitted to be used by CEC and/or other occupancy restrictions. The below installation methods do not intend to suggest that these materials be installed in conflict with any applicable code. Special attention to applications shall be made in building types such as Educational, Health Care, wet location, hazardous locations, assembly occupancy and multi-story, but not limited to these. Requirements which are more restrictive than the CEC may be called for by the drawings and / or these specifications. These requirements must be adhered to. The Electrical Contractor shall be responsible to use the proper conduit system for the application. Exposed conduit is not allowed below ceilings or above slab of floor, without the permission and approval of the Architect. All conduits shall be concealed except in electrical rooms or where shown to be surface mounted. Exposed conduit (where allowed) shall be run square and plumb with building lines in an approved manner. Support roofmount conduits, where allowed, Cooper B-Line DB10 (or equal) or as specified in roofing specification, by the Architect. Strap conduits to blocks with proper sized conduit straps. Spacing of support shall be a minimum as provided for in the CEC. All exposed conduit mounted below 8’ above finished grade shall be strapped at a minimum of 5’ spacing.

B. Non-Metallic Rigid Conduit shall be used in concrete slabs, below concrete slabs on grade, or underground outside of a building slab or foundation. Maintain minimum depth requirements and cover with appropriate fill material. Minimum 4” of bedding and cover of backfill material 1/4” size grain and smaller maximum. Conduit shall be heavy wall Schedule 40 or 80, rigid PVC only. Rigid utility P&C duct shall not be used in any application. Properly sized grounding conductors shall be installed per CEC article 250, in all non-metallic conduit branch circuit and feeder runs. PVC conduit shall be formed or field bent only with the use of properly approved bending tools such as to not decrease the internal bore of the conduit. All conduits shall be cut square and reamed of burrs. Approved and compatible glue shall be used on all PVC fittings to
attain watertight joints. All non-metallic conduit runs over 150’ in length and over 1 1/4”
trade size conduit shall utilize galvanized rigid steel elbows.

C. Galvanized Rigid Steel (GRS) conduit shall be used where exposed less than 8’–0”
above finished grade to 18” below finished grade and where subject to physical
damage. Conduits shall be cut square and reamed to remove burrs and sharp edges.
Strap conduit below 8’ above grade at 5’ intervals. All threaded ends entering a
junction box of any type shall require one locknut on the inside and one on the outside
of the enclosure and be provided with a plastic bushing or grounding bushing where
necessary for proper grounding. Where exposed to moisture, a watertight hub or other
approved method shall be required. All conduits shall be stubbed up straight and
uniform into junction boxes, panels, cabinets, etc., and shall be (GRS) properly
supported and strapped. All GRS conduit located below grade, shall be tape wrapped.

D. Electrical Metallic Tubing (EMT) shall be used as allowed by code and as permitted by
this specification. It shall not be in contact with soil or the concrete slab on the ground
floor of any structure. Connectors and couplings shall be steel set screw type where
installed in indoor dry locations not subject to moisture. Where the potential for
moisture is present, compression type weathertight fittings are required. One hole
conduit straps are permitted from 1/2” to 1” and two hole conduit straps are required for
size 1 1/4” and larger. EMT shall not be allowed in areas subject to severe physical
damage. Install copper ground wire sized per CEC 250-122 in all EMT conduits.

E. Flexible conduit may be used where concealed in building construction or above
dropped ceilings, but shall meet the following criteria: No individual circuit path from
distribution panel to last device shall exceed a cumulative length of 6’ of flexible conduit
from start to end. Flexible conduit shall not exceed a total directional change of 270
bending degrees in any one run between conduit terminations. Squeeze type or Jake
type steel flex fittings of a grounding type are required. Flexible conduit must be
supported in accordance with CEC. Where exposed to the weather, moisture, or spray
down flexible conduit shall be of the liquidtight type. Fittings shall be manufactured for
use with liquidtight flexible conduit. All motor connections shall be made with liquidtight
flex. Flexible conduit may not be used where exposed except for last 2’ of equipment
connection and unless otherwise noted or approved. A copper ground wire sized per
CEC 250-122 shall be installed in all flexible conduit runs. Flexible conduit may not be
used exposed. Weatherproof liquid tight conduit shall not be used at roof level for
equipment connections with lengths exceeding 24” nor shall it be used to circumvent a
rigid conduit system in a horizontal direction. Connect recessed lighting fixtures to
conduit runs with a maximum of 6’ of flexible metal conduit extending from junction box
to fixture. “Master” “Slave” fixtures are permitted to use manufactured flexible cable of
longer dimension up to 12’ between “Master” and “Slave” only and only as a U.L. listed
system component.

F. Underground conduits and transition to above grade/slab shall be as follows:
   1. PVC elbows allowed if top of elbow is minimum 18” BFG or below top of slab,
otherwise GRS elbows are required.
   2. GRS elbows are required if conduit run is 150’ or greater.
   3. All risers must be GRS from elbow below grade to equipment (device, outlet,
panel, cabinet, etc.) above grade.
   4. GRS elbows/risers to be 10 MIL taped wrapped (1/2” lapped) to 3” above finish
grade or top of slab.
G. Conduit Supports: Conduit runs may be supported by one-hole and two-hole straps or supports as manufactured by Unistrut, Minerallac, Caddy or equals. Supports may be fastened by means of anchors, shields, beam clamps, toggle bolts, or other approved methods appropriate for the application and size of conduit. Pipe nailers (J-hooks) may only be used for 1” conduit and smaller and only in wood frame construction. Conduit support methods are subject to review by the engineer and authority having jurisdiction for adequacy. Installations deemed inadequate shall be corrected by the contractor at no cost to the Owner.

H. Bends and offsets shall be made with approved tools for the type of conduit being utilized. Bends shall be made without kinking or destroying the smooth bore of the conduit. Parallel conduits shall be run straight and true with bends uniform and symmetrical. Minimum radii shall be per CEC 344-24.

I. Conduit Stub-outs below grade shall be capped with plastic cap, and identified by placing a pull box marked with correctly identified utility such as “Elec”, “Tel”, etc. Dimension for exact location on field record drawings. Provide lids for proper field application (i.e. traffic, incidental, pedestrian).

J. Conduit Seals: Where below grade conduits enter structure through slab or retaining wall of building or basement, seal the inside of each conduit as follows:
   1. Provide damming material around conductors 3” into conduit.
   2. Fill 3” of conduit with 3M #2123 sealing compound.
   3. Wrap conductors where they exit the conduit with 3M #2229 "Scotch Seal" mastic tape. Lap tape to approximate diameter of the raceway and wrap outside of conduit opening with (minimum) one turn.
   4. Use conduit sealing bushings type CSB (O-Z/Gedney) or equal.
   5. Empty conduits shall be sealed with standard non-hardening duct seal compound and then capped to prevent entrance of moisture and gases and to meet fire resistance requirements.
   6. Provide cable drip loop minimum 12” high.

K. Marker tape: Place plastic yellow marker tape at 12” below finish grade along and above buried conduits. Label tape "CAUTION: ELECTRICAL LINES BELOW" or similar wording.

L. Electrical and communications systems raceways routed underground shall not occupy the same trench as plumbing utilities such as sewer, water, storm drain, gas or other wet or dry gaseous utility system. A minimum of 12” of undisturbed earth is required. Where utilities must cross in closer proximity to each other due to physical constraints, 6” minimum crossing distances are allowed, however 18” on all sides of a utility crossing must be concrete encased.

M. Duct bank defined here-in shall be four or more conduits in a common trench, conduit spacers and saddles shall be required in all trenches where more than two conduits over 2” in diameter travel in the same trench. Proper spacing between systems as outlined above shall be required and spacers shall be located each 5’ (maximum) along trench route from point to point.
N. Conduits, routed below footings, slabs, grade beams, columns, and other structural elements shall be installed in strict compliance with structural details and criteria shown on structural plans. Clearances below structural elements and sleeves through structural elements must be carefully planned to avoid conflict and must be approved by the structural engineer if conflict arises.

O. All conduit or raceways passing through fire rated walls, floors, or ceilings shall be installed with a listed penetration method which protects the opening to the same rating as the assembly and is non hardening.

P. Expansion Joints
1. Conduits 3" and larger, that are secured to the building structure on opposite sides of a building expansion joint, require expansion and deflection couplings. Install the couplings in accordance with the manufacturer’s recommendations.
2. Provide conduits smaller than 3" with junction boxes on both sides of the expansion joint. Connect conduits to junction boxes with sufficient slack of flexible conduit to produce 5” vertical drop midway between the end. All conduit shall have a copper green grounding bonding conductor installed.

Q. Seismic Joints
1. At seismic joints, provide conduits rigidly secured to the building structure on opposite sides of a building expansion joint with junction boxes or approved fittings, on both sides of the joint. Connect conduits to junction boxes with sufficient slack flexible conduit such that these slack conduits are 1 1/2 times the distance between conduit ends. Flexible conduit shall have a copper green ground bonding jumper installed.

R. Location: Locate boxes and conduit bodies so as to ensure accessibility of electrical wiring.

S. Anchoring: Secure boxes rigidly to the substrate upon which they are being mounted, or solidly embed boxes in concrete or masonry.

T. Special Application: Provide weatherproof outlets for locations exposed to weather or moisture.

U. Knockout Closures: Provide knockout closures to cap unused knockout holes where blanks have been removed.

V. Mount outlet boxes, unless otherwise required by ADA, or noted on drawings, the following distances above the finished floor:
1. Receptacles, Telephone, TV & Data outlets. (measured to bottom of outlet box): +15”.
2. Outlet above counter (measured to top of outlet box): +46”.
3. Control (light) Switches. (measured to top of outlet box): +48”.
5. Fire Alarm Visuals: the lower of +80" to bottom of lens, or 6" below ceiling.
6. Other Outlets: As indicated in other sections of specifications or as detailed on drawings.
W. Coordinate all electrical device locations with the architectural floor plan and interior and exterior elevations to prevent mounting devices within elements that they may conflict such as cabinetry, mirrors, planters, etc.

X. Size outlet and junction boxes to minimum wire fill space requirements. Upsize box as required to allow ease of wire installation and device installation.

Y. Outlet and junction boxes in fire rated walls shall be gauged and spaced so as not to exceed the maximum penetration allowed by the assembly without compromising the fire rating. If a conflict arises relative to a specific condition, the contractor shall follow the requirements of the fire authority and ask for guidance from the design team. At no time should a larger box be installed prior to resolution of conflict.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:
1. Manholes, handholes and ducts to form a complete underground raceway system.
2. “Duct” and “conduit”, and “raceway” are used interchangeably in this specification and have the same meaning. Refer to Section 26 05 33, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS for approved raceway and materials as well as execution.
3. Scope of Work: Furnishing, installation and connection of manholes, handholes and ducts to form a complete underground raceway system for distribution of electrical and signal systems and utility service entrance facilities. This specification shall also provide guidance for construction of the utility company underground and substructure requirements. Contact serving company directly and obtain current detailed requirements of installation and adhere by same. Provide trenching, conduit, backfill, boxes and equipment pads as applicable. Nothing here in shall be construed to be in conflict with the requirements of the utility company, which shall take precedence over any possible conflicting requirement.

B. Related Work:
1. SITEWORK.
2. FLATWORK.
3. LANDSCAPING.
4. Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.
5. Section 26 05 33, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS: Conduits, fittings and boxes for raceway systems.
6. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

1.3 SUBMITTALS

A. Submit in accordance with Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.

B. Shop Drawings:
1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
2. Include manholes, handholes, duct materials, and hardware. Proposed deviations from details on the drawings shall be clearly marked on the submittals.
3. If necessary to locate manholes or handholes at locations other than shown on the drawings, show the proposed locations accurately on scaled site drawings.
4. Precast manholes and handholes: Submit detail drawings and design calculations for approval prior to installation.

1.4 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

B. Underwriters Laboratories, Inc. (UL):
   1. UL 467 Grounding and Bonding Equipment
   2. UL 651 Schedule 40 and 80 Rigid PVC Conduit
   3. UL 6 Electrical Rigid Metal Conduit-Steel

C. National Fire Protection Association (NFPA):
   1. 70 California Electrical Code (CEC)

D. National Electrical Manufacturers Association (NEMA):
   1. RN 1 Polynvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit
   2. TC 2 Electrical Polynvinyl Chloride (PVC) Tubing And Conduit
   3. TC 3 PVC Fittings For Use With Rigid PVC Conduit And Tubing

E. American Concrete Institute (ACI):
   1. 318 Building Code Requirements For Structural Concrete

F. American Society for Testing and Materials (ASTM):
   1. C478 Standard Specification for Precast Reinforced Concrete Manhole Sections

G. Utility company Handout Package and Construction Requirements for Underground and Substructure Installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Concrete: ACI 318, 3000 psi minimum 28 day compressive strength.
B. Reinforcing Steel: Number 4 minimum.

C. Manhole Hardware:
   1. Frames and covers (traffic type).
   2. Sump frames and gratings.
   3. Pulling Irons: 7/8” diameter hot dipped galvanized steel bar with exposed triangular shaped opening.
   4. Cable supports:
      a. Cable stanchions, hot rolled, heavy duty, hot dipped galvanized "T" section steel 2 1/4" by 1/4" in size and punched with 14 holes on 1 1/2" centers for attaching cable arms.
      b. Cable arms, 3/16” gage, hot rolled, hot dipped galvanized sheet steel pressed to channel shape. Arms shall be approximately 2 1/2” wide and 14” long.
      c. Insulators for cable supports, high glazed, wet process porcelain.
      d. Spares: Equip each cable stanchion with two spare cable arms and six spare insulators for future use.
      e. Miscellaneous hardware, hot dipped galvanized steel.

D. Handhole Hardware:
   1. Frames and covers configuration as shown on the drawings.
   2. Pulling irons, 7/8” diameter galvanized steel bar with exposed triangular shaped opening.

E. Cable supports are not required.

F. Ground Rod Sleeve: Provide a 3” PVC sleeve in manhole floors so that a driven ground rod may be installed.

G. Manholes and Handholes shall be precast units and be constructed as described below. Units shall comply with ASTM C478, C478M.
   1. Size: Plan area and clear height shall be not less than that shown on the drawings.
   2. Accessories, hardware, and facilities shall be the same as required for poured in place type.
   3. Assume ground water level 3’ below ground surface unless a higher water table is shown in the boring logs and adjust design accordingly.

H. Ducts:
   1. Size shall be as shown on drawings.
   2. Ducts (concrete encased):
      a. Plastic Conduit:
         1) NEMA TC6 & 8 and TC9 plastic utilities conduit UL 651 and 651A Schedule 40 PVC.
         2) Duct shall be suitable for use with 90 degree C rated conductors.
   3. Ducts (direct burial):
      a. Plastic duct:
         1) NEMA TC2 and TC3, EPC-40, Type II.
         2) UL 651 and 651A, Schedule 40 Schedule 80 PVC.
         3) Duct shall be suitable for use with 75 degree C rated conductors.
b. Rigid metal conduit, PVC-coated: UL6 and NEMA RN1 galvanized rigid steel, threaded type, coated with PVC sheath bonded to the galvanized exterior surface, nominal 0.040” thick.

I. Ground Rods: Per Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

J. Ground Wire: Stranded bare copper No. 6 AWG minimum.

K. Conduit Spacers: Prefabricated plastic.

L. Warning Tape: Standard 4 mil polyethylene 3” wide tape, detectable type, red with black letters, imprinted with “CAUTION BURIED ELECTRIC CABLE BELOW”.

M. Pull Rope: Plastic with 200 pound minimum tensile strength.

PART 3 - EXECUTION

3.1 TRENCHING

A. Refer to EARTHWORK section of specification for trenching back-filling, and compaction requirements.

B. Work with extreme care near existing ducts, conduits, cables, and other utilities to avoid damaging them.

C. Cut the trenches neatly and uniformly for utility company trenches, notify for inspections by utility company a minimum of 48 hours in advance.

D. Conduits to be installed under existing paved areas, roads, and railroad tracks which are not to be disturbed shall be protected into place. Conduits shall be minimum 36” cover.

E. Trench Preparation: A 4” sand bedding is required if trench bottom is not rock free. A 4” sand covering over the cable is required if the native backfill is not rock free. Backfill and compaction should meet City, County, State and utility company requirements. The serving utility company may required 100% sand backfill. All backfill requirements shall also meet or exceed those set forth in the earthwork or civil section of this specification.

F. Excavation: Provide 6” gravel in bottom of excavated holes for subsurface transformers and all concrete boxes. Spare gravel shall be available for final adjustment. The Contractor is responsible for final grade level of enclosures and boxes. Non-conformance will be corrected by electrical contractor at his expense.

G. Conduit Routing: Sharp turns, bends, or other irregularities in the conduit must be avoided. Minimum radius bends shall be as required by the serving utility company. Every effort should be made to obtain a straight water tight conduit line. The end of all
spear conduits must be capped. The utility company Inspector must approve deviation from layout.

H. Conformance: All work must conform to the utility company “handout package” and Specification 59 and/or 99. Copies are available from the utility company upon request.

I. Joint Trenching: Maintain all required depths, clearance and separations as required by code, ordinance or utility company policies. Coordinate with other utilities to confirm requirements.

3.2 OTHER PADMOUNTED EQUIPMENT

A. Provide adequately sized and reinforced concrete pads with openings for conduit(s) as necessary by the utility company and or the equipment manufacturer.

B. A grounding system shall be installed at each padmounted piece of equipment including, but not limited to, a ground rod, grounding conductor, ufer, and ground grid (if called for).

C. Padmounted equipment shall be bolted to concrete pad with minimum 5/8” x 7 1/2” anchor bolts, one in each of 4 corners of each section of padmounted equipment.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Related Work:
   1. Section 26 05 33, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.

1.2 WORK INCLUDED

A. Contact the serving utility company at start of construction and again 30 days prior to date that service cable placement will be required.

B. Compliance with Standards: the serving utility company reserves the right to refuse to use any conduit, pullboxes, manholes or utility boxes that deviate from applicable building codes, plans and/or specifications.

1.3 DEFINITIONS

A. RNC: Rigid nonmetallic conduit

B. UFER: concrete-encased electrode

PART 2 - PRODUCTS

2.1 MATERIALS

A. Telephone Cabinet shall be provided with a ¾" thick plywood and a #6 THHN solid copper ground wire in 1/2" conduit run to a main electric service ground: either the concrete-encased electrode ("UFER") or the metal underground water pipe.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Service Conduits shall be RNC Schedule 40 or GT-80 below grade except at bends up to and including above grade which shall be RNC Schedule 80. Verify with utility prior to installation.
   1. Mandrel and measure conduits end-to-end to facilitate the utility ordering of cables.
   2. Provide minimum 3/16" pull rope in each conduit.
   3. Minimum cover for conduit shall be 30".
   4. Minimum separation from power conduit(s) in joint trench shall be 12" of compacted soil or 3" of concrete.
   5. Conduits at backboard shall extend 2" above finish floor or 6" below ceiling and 1" out from face of backboard.
   6. Minimum radius of bends from trench to building shall be 36".

B. 300' Conduit length and bending limits: Unless otherwise shown on the plan, service entrance conduit length shall not exceed for 4" conduit or 250' for 2" conduit. Not including risers, conduits shall have a maximum of 270 degrees total of bending including a maximum of two 90 degree bends. If these limits are exceeded, a pull box will be required.

C. All manholes, pullboxes and utility boxes shall be sized per plan with cover marked "TELEPHONE" as manufactured by Associated Concrete or Plastic Products "Quikset", Brooks, Christy or equal as approved by the utility company.
   1. Pullboxes shall be provided with cable racking and torsion parkway cover. If required by the utility, also provide with 5’ ground rod driven 4’ into ground.
   2. Utility boxes shall be provided with 5’ ground rod driven 4’ into ground if required by the utility.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:
   1. Nameplates and warning signs where specified herein and as shown on contract documents including the following:
      a. Nameplates and warning signs permanently installed on all electrical equipment and devices including, but not limited to, the following items:
         1) Enclosures for transformers, switchboards, motor control, panels, pullboxes, cabinets, motors, generators, transfer switches.
         2) Enclosures for all separately enclosed devices including, but not limited to, disconnect switches, circuit breakers, contactors, time switches, control stations and relays, fire alarm panels and lighting control panel.
         3) Wall switches not within sight of outlet controlled.
         4) Special systems such as, but not limited to, telephone, fire alarm, warning and signal systems. Identification shall be at each equipment rack, terminal cabinet, control panel, annunciator and pullbox.
         5) Devices mounted within and part of equipment including circuit breakers, switches, control devices, control transformers, relays, indication devices and instruments.

   2. Conductor and Cable Identification.

B. Related Work:
   1. Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.
   2. Section 26 05 19, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES.
   3. Section 26 24 16, PANELBOARDS.
PART 2 - PRODUCTS

2.1 EQUIPMENT LABEL DESIGNATIONS

A. Equipment labels indicating equipment designations both emergency and normal. Designation data per drawings or to be supplied with shop drawings approval.

B. Panelboard labels showing panel designation, voltage, phase and source.

C. In accordance with CEC 110.16, provide arc flash protection warning labels on all switchboards, panelboards, distribution panels, transformers, safety switches, transfer equipment, etc. Labels shall be per ANSI Z535.4 guidelines.

2.2 MATERIALS

A. For Labels: Three layer laminated plastic or micarta with engraved white letters over black background.

B. For Emergency Equipment: Use engraved white letters over red background.

C. For Warning Signs: Minimum 18 gauge steel with red lettering on white porcelain enamel finish.

D. Arc flash labels shall be provided as required by CEC Article 70E.

E. Conductor tape number markers: TayMac MX4280 Series non-fading permanent adhesive.

PART 3 - EXECUTION

3.1 MOUNTING

A. Equipment labels shall be mounted by self-tapping, threaded screws and bolts, or by rivets. Adhesive types are not acceptable unless specifically noted in this section.

B. Conductor tape markers shall be consistently placed for ready conductor identification.

3.2 HEIGHTS ON LABELS

A. Panelboards, Switchboards and Motor Control Centers and Special Systems Enclosures: 1/4" identify equipment designation; 1/8" identify voltage rating and source.

B. Individual Circuit Breakers, Switches, and Motor Starters in Panelboards, Switchboards, and Motor Control Centers: 3/16" identify circuit and load served, including location of equipment.

D. Transformers: 3/16" identify equipment designation; 1/8" identify primary and secondary voltages, primary source and secondary load. Include location of primary source or secondary load if remote from transformer.

3.3 WARNING SIGNS

A. Warning signs shall be permanently mounted with cadmium plated steel screws or nickel-plated brass bolts.

B. Warning signs to read "DANGER - HIGH VOLTAGE", with letters 1 1/2" high, 3/16" stroke minimum.

C. Provide warning sign on all doors or immediately next to door for equipment rooms, enclosures or closets containing equipment energized above 150 volts to ground as per CEC, and/or as directed by the Architect. For interior finish spaces and interior doors, signage shall be coordinated and approved with the Architect in advance of installation.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:
   1. Panelboards.
   2. Manufacturer shall provide certification that the equipment supplied under this Section has been reviewed and certified to meet the current criteria for special seismic certification in compliance with 2013 CBC 1705. Include seismic companion anchorage requirements from the testing and as approved by the manufacturer. The manufacturer shall provide an approved label on the equipment enclosure stating that the equipment has been awarded a certificate of compliance for special seismic certification. The label shall include special seismic certification pre-approval number when relevant.

B. Related Work:
   1. Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.
   2. Section 26 05 33, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.
   3. Section 26 05 19, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Cables and wiring.
   4. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.

1.3 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

B. Underwriters Laboratories, Inc. (UL):
   1. No. 50-1995 Enclosures for Electrical Equipment
   2. No. 67-1993 Panelboards
   3. No. 489-1991 Molded Case Circuit Breakers and Circuit Breaker enclosures

C. National Fire Protection Association (NFPA):
   1. No. 70-2010 California Electrical Code (CEC)
D. National Electrical Manufacturers Association (NEMA):
   1. No. PB-1-2002 Panelboards.
   2. No. AB-3-1996 Molded Case Circuit Breakers and Their Application.

PART 2 - PRODUCTS

2.1 PANELBOARDS

A. Panelboards shall be in accordance with UL, NEMA, NEC, CEC and as shown on the
drawings. Approved manufacturers are Cutler Hammer, Square D, Siemens, General
Electric.

B. Panelboards shall be standard manufactured products. All components of the
panelboards shall be the product and assembly of the same manufacturer. All similar
units of all panelboards to be of the same manufacturer.

C. All panelboards shall be dead front safety type. Arrange sections for easy removal
without disturbing other sections.

D. All panelboards shall be completely factory assembled with molded case circuit
breakers. All factory wiring shall be checked for correct tightness and visually
inspected to insure that bussing and terminations have not become loose in transit to
job site.

E. Panelboards shall have main breaker or main lugs, bus size, voltage, phase, top or
bottom feed, and flush or surface mounting as scheduled on the drawings. Refer to
single line diagram and panel schedules on drawings. Terminals shall be minimum 75
degree rated. Back fed main circuit breakers are not allowed. Main circuit breakers
shall be vertically mounted.

F. Panelboards shall have the following features:
   1. Nonreduced size copper bus bars, and connection straps bolted together and
      rigidly supported on molded insulators. Bus bar taps for panels with single pole
      branches shall be arranged for sequence phasing of branch circuit devices.
   2. Full size neutral bar, mounted on insulated supports.
   3. Ground bar and isolation ground bar (where called for in panel schedule) with
      sufficient terminals for all grounding wires. Buses braced for the available short
      circuit current.
   4. All breakers and phase bus connections shall be arranged so that it will be
      possible to substitute a 2-pole breaker for two single pole breakers, and a 3-pole
      breaker for three single pole breakers, when trip is 30 amps or less and frame
      size is 100 amperes or less, without having to drill and tap the main bus bars at
      bus straps. Where used for heating and air conditioning, and refrigeration
      equipment, use only HACR type U.L. listed circuit breakers.
   5. Design interior so that protective devices can be replaced without removing
      adjacent units, main bus connectors, and without drilling or tapping.
   6. Where designated on panel schedule as "space", include all necessary bussing,
      device support and connections. Provide blank cover for each space.
7. In two section panelboards, the main bus in each section shall be full size. The first section shall be furnished with subfeed lugs on the line side with cable connections to the second section. Panelboard sections with tapped bus or crossover bus are not acceptable.

8. Series rated panelboards are not permitted.

9. Label all panels in accordance with Section 26 05 53, IDENTIFICATION OF ELECTRICAL SYSTEMS.

G. Panelboards serving as building mains shall be “service entrance rated” and UL Listed as “service equipment”.

2.2 CABINETS AND TRIMS

A. Cabinets:
   1. Provide galvanized steel cabinets to house panelboards. Cabinets for outdoor panels shall be factory primed and suitably treated with a corrosion-resisting paint finish meeting UL standard for outdoor applications.
   2. All ventilated openings in panelboards and switchboards, shall be furnished with dust filters to prevent entrance of dust and debris.
   3. Cabinets for panelboards may be of one piece formed steel or of formed sheet steel with end and side panels welded, riveted, or bolted as required.
   4. Provide necessary hardware for "in" and "out" adjustment of panel interior.
   5. Cabinets for two section panelboards shall be arranged side by side, and shall be the same height. Flush mounted cabinets should be 1 1/2" apart and coupled by conduit nipple if necessary.
   6. Gutter size in panel boxes, on all sides, shall be in accordance with the CEC. Penetrations through gutter to live area of the panelboard shall incorporate approved non-metallic-grommet type of insulation to protect wire passing through.

B. Trims:
   1. Fabricate trim of sheet steel consisting of frame with door attached by concealed hinges. Provide flush or surface trim as shown on the drawings.
   2. Flush trims shall overlap the box by at least 3/4" all around.
   3. Surface trim shall have the same width and height as the box.
   4. Flush or surface trims shall not have ventilating openings.
   5. Secure trims to back boxes by indicating trim clamps.
   6. Provide a welded angle on rear of trim to support and align trim to cabinet.
   7. Provide separate trims for each section of multiple section panelboards. Trims and doors of sections shall be of the same height.

C. Doors:
   1. Provide doors with flush type latch and manufacturer's standard lock. Doors over 48 inches in height shall have a vault handle and a three-point catch, arranged to fasten door at top, bottom, and center.
   2. In making switching devices accessible, doors shall not uncover any live parts.
   3. Provide concealed hinges welded to the doors and trims.
   4. For lighting or power contactors incorporated in panelboards, provide separate doors for the contactors.
   5. Provide keyed alike system for all panelboards.
6. Provide a directory card, metal holder, and transparent cover. Permanently mount holders on inside of doors.

D. Painting:
1. Thoroughly clean and paint trims and doors at the factory with primer and manufacturer's standard finish.

2.3 MOLDED CASE CIRCUIT BREAKERS FOR PANELBOARDS

A. Breakers shall be UL listed and labeled, in accordance with the CEC, as shown on the drawings, and as specified.

B. Circuit breakers in panelboards shall be bolt on type on phase bus bar or branch circuit bar.
   1. Molded case circuit breakers for lighting and appliance branch circuit panelboards shall have minimum interrupting rating as indicated.
   2. Molded case circuit breakers shall have automatic, trip free, non-adjustable, inverse time, and instantaneous magnetic trips for 100 ampere frame or less. Magnetic trip shall be adjustable from 3 times to 10 times for breakers with 600 ampere frames and higher. Factory setting shall be HI, unless otherwise noted.

C. Breaker features shall be as follows:
   1. Integral housing of molded insulating material.
   2. Silver alloy contacts.
   3. Arc quenchers and phase barriers for each pole.
   4. Quick-make, quick-break, operating mechanisms.
   5. A trip element for each pole, thermal magnetic type with long time delay and instantaneous characteristics, a common trip bar for all poles and a single operator.
   6. Electrically and mechanically trip free.
   7. An operating handle which indicates ON, TRIPPED, and OFF positions.
      a. Line connections shall be bolted.
      b. Interrupting rating shall not be less than the maximum short circuit current available at the line terminals as indicated on the drawings. The interrupting rating shall not be less than the minimum identified requirement.
   8. An overload on one pole of a multipole breaker shall automatically cause all the poles of the breaker to open.

2.4 SEPARATELY ENCLOSED MOLDED CASE CIRCUIT BREAKERS

A. Where separately enclosed molded case circuit breakers are shown on the drawings, provide circuit breakers in accordance with the applicable requirements of those specified for panelboards.

B. Enclosures are to be of the NEMA types shown on the drawings. Where the types are not shown, they are to be the NEMA type most suitable for the environmental conditions where the breakers are being installed.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation shall be in accordance with CEC, as shown on the drawings, and as specified.

B. Locate panelboards so that the present and future conduits can be conveniently connected. Coordinate the sizes and layout of cabinets within the designated spaces. All equipment must be dimensioned in order to physically fit in the spaces provided and to comply with all code required clearances.

C. Install a typewritten schedule of circuits in each panelboard. Include the room numbers (as finally described by the Owner) and items served on the cards. Obtain final room numbers from Architect prior to creating schedule.

D. Mount the panelboard so that maximum height of the top circuit breaker above finished floor shall not exceed 78 inches.

E. For panelboards located in areas accessible to the public, paint the exposed surfaces of the trims, doors, and boxes with finishes to match surrounding surfaces after the panelboards have been installed.

F. Circuit numbers shall correspond to the approved panel schedule. Provide as-built drawings showing the actual circuit numbers being used for each device on each branch circuit if changes are required.

G. Verify depth of all flushmounted enclosures in walls to be certain wall depth will accommodate panel depth prior to installation.

H. All openings in switchgear and panelboards that are unused shall be sealed with bolts and washers. Use caulking where holes or openings cannot be sealed by way of a washer, or bolts or conduit seals.

I. Contractor shall include the services of an independent testing company to test GFI circuit breakers in distribution and main panelboards.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:
   1. Wiring devices.

B. Related Work:
   1. Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.
   2. Section 26 05 33, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.
   3. Section 26 05 19, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES.
   4. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.

PART 2 - PRODUCTS

2.1 RECEPTACLES

A. General: All receptacles shall be listed by Underwriters Laboratories, Inc.
   1. Mounting straps shall be plated steel, with break-off plaster ears and shall include a self-grounding feature (this feature does not substitute for a grounding conductor terminated on grounding strap of device). Terminal screws shall be brass, brass plated or a copper alloy metal.
   2. Receptacles shall be of a screw terminal type, “pressure type quick wire” terminations are not allowed.

B. Duplex receptacles shall be premium specification grade single phase, 20 ampere, 120 volts, 2-pole, 3-wire, and conform to the NEMA 5-20R configuration in NEMA WD 6. The duplex type shall have bussing break-off feature for two-circuit operation. The ungrounded pole of each receptacle shall be provided with a separate terminal.
   1. Bodies shall be white.
   2. Switched duplex receptacles shall be wired so that only the top receptacle is switched. The remaining receptacle shall be unswitched.
   3. Receptacles powered by Arc Fault circuit breakers must be tamperproof outlets.
   4. Ground Fault Interrupter Duplex Receptacles: Shall be an integral unit suitable for mounting in a standard outlet box.
a. Ground fault interrupter shall be commercial grade and consist of a differential current transformer, solid state sensing circuitry and a circuit interrupter switch. It shall be rated for operation on a 60 Hz, 120 volt, 20-ampere branch circuit. Device shall meet CEC requirements. Device shall have a minimum nominal tripping time of 1/30th of a second. Devices shall meet UL 943.

C. Receptacles; 20, 30 and 50 ampere, 250 volts: Shall be complete and match with appropriate cord grip plug. Devices shall meet UL 231.

D. Weatherproof Receptacles: Shall consist of a listed weather resistant duplex receptacle, mounted in box with a gasketed, while in use weatherproof, cast metal cover plate and cap receptacle opening. The cap shall be permanently attached to the cover plate by a spring-hinged flap. Approved manufacturers: Intermatic WP10 Series, Thomas & Betts/Red Dot 2CK Series, or engineer approved equal.

2.2 SWITCHES

A. Toggle switches shall be totally enclosed tumbler type with bodies of phenolic compound. Toggle handles color to match receptacle device color unless otherwise specified.
1. Shall be single unit toggle, butt contact, quiet AC type, heavy-duty general-purpose use with an integral self grounding mounting strap with break-off plastors ears and be of a screw terminal type.
2. Shall be color coded for current rating, listed by Underwriters Laboratories, Inc., and meet the requirements of NEMA WD 1, Heavy-Duty and UL 20.
3. Ratings:
   a. 120 volt circuits: 20 amperes at 120-277 volts AC.
   b. 277 volt circuits: 20 amperes at 277 volts AC.
4. The switches shall be mounted on the strike plate side of doors.
5. Incorporate barriers between switches with multi-gang outlet boxes where required by the CEC.
6. All toggle switches shall be of the same manufacturer.

2.3 WALL PLATES

A. Wall plates for switches and receptacles shall be type 302 stainless steel at Apparatus Bay, Kitchen, and Shop. Thermoplastic everywhere else.

B. Standard NEMA design, so that products of different manufacturers will be interchangeable. Dimensions for openings in wall plates shall be accordance with NEMA WD1.

C. For receptacles or switches ganged together, wall plates shall be a single ganged plate.

D. Wall plates for data, telephone or other communication outlets shall be as specified in the associated specification.
E. Surface mounted boxes, NEMA1, shall be industrial grade raised galvanized steel covers. In shop areas all receptacles shall be dust proof and or waterproof where applicable.

F. Waterproof device covers shall be cast iron, 4-corner screw type, for FS and FD type mounting. Device covers shall be zinc galvanized finish. Weatherproof covers shall be lockable.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Switches installed in hazardous areas shall be explosion proof type in accordance with the CEC and as shown on the drawings.

B. Installation shall be in accordance with the CEC, NECA “Standard of Installation”, and as shown as on the drawings.

C. Ground terminal of each receptacle shall be bonded to the outlet box with an approved green bonding jumper, and also be connected to the green equipment grounding conductor.

D. General: Devices shall be of the type specified herein. All devices shall be installed with “pigtailed” leads from the outlet box. No device shall be used in the “feed through” application. Screw terminals shall be used to connect all devices to the circuit and shall be grounded by means of a ground wire where grounding terminals are provided in the device.

E. Installation: Devices and plates shall be installed in a “plumb” condition and must be flush with the finish surface of the wall where boxes are recessed.

F. Mounting heights: All control and convenience devices shall comply with California Code of Regulations Title 24 and ADA with respect to accessibility requirements. Mounting heights indicated on plans shall have precedence.

G. Install switches with the off position down.

H. Clean debris from outlet boxes.

I. Provide extension rings as required to bring outlet boxes flush with finished surface or casework.

J. Test each receptacle device for proper polarity.

END OF SECTION
1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Applicable Codes and Standards:
   4. 2019 California Fire Code (CFC) Only if 12 ft. vent pipe required.

1.2 REQUIREMENTS OF REGULATORY AGENCIES

A. An electric generating system or Emergency Power Supply (EPS), consisting of a prime mover, generator, governor, coupling and controls, must have been tested, as a complete unit, on a representative engineering prototype model of the equipment to be sold.

B. The generator set must conform to applicable California Electrical Code and applicable authorities having jurisdiction including DSA and CSFM.

C. The generator set must be available with the Underwriters Laboratories listing (UL 2200) as a stationary engine generator assembly.

D. The generator shall meet all of the following standards: The generator set shall be EPA and CARB Emissions Certified for non-road applications and meet all local emission standards and requirements. It shall meet all local County or Regional APCD requirements.

E. The generator control and remote annunciation shall be compatible with the transfer microprocessor based logic controller integrated in the main switchboard. The transfer
controller shall communicate through open protocol to energy management system or data network to provide remote status indication.

1.3 MANUFACTURER QUALIFICATIONS

A. This system shall be supplied by KOHLER or engineer approved equal, who has been regularly engaged in the production of engine-alternator sets and associated controls for a minimum of twenty years, thereby identifying one source of supply and responsibility.

B. To be classified as a manufacturer, the builder of the generator set must manufacture, at minimum, engines or alternators.

C. The manufacturer shall have printed literature and brochures describing the standard series specified, not a one of a kind fabrication.

D. Substitutions: The emergency power system has been designed to the specified manufacturer's electrical and physical characteristics. The equipment sizing, spacing, amounts, electrical wiring, ventilation equipment, fuel and exhaust components have all been sized and designed around equipment. Should any substitutions be made, the contractor shall bear responsibility for the installation, coordination and operation of the system as well as any engineering and redesign costs which may result from such substitutions. Alternate equipment suppliers shall follow all submittal requirements outlined in the general conditions as part of the submittals, the substitute manufacturer shall supply as a minimum engine, alternator and control panel wiring diagrams and schematics. A separate list of all printed circuit boards with part numbers and current pricing must also be included.

1.4 UNIT TESTING

A. Before shipment of the equipment, the engine-generator set shall be tested under rated load and rated power factor for performance and proper functioning of control and interfacing circuits. Tests shall include:
   1. Verifying all safety shutdowns are functioning properly.
   2. Verify single step load pick-up per NFPA 110 Paragraph 7.13.7.
   3. Verify transient and voltage dip responses and steady state voltage and speed (frequency) checks.
   4. Submit the certification of the factory test, including recorded ambient temperature, altitude, and fuel grade.

1.5 SUBMITTALS

A. Submit in accordance with Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.

B. Owner's Manuals: provide three (3) sets of owner's manuals specific to the product supplied must accompany delivery of the equipment. General operating instruction,
preventive maintenance, wiring diagrams, schematics and parts exploded views specific to this model must be included.

C. Submittals: Provide complete sets of Engineering Submittal for approval, prior to production release, showing all components, in addition to the engine and generator. Submittals shall include compliance with these specifications. Refer to general requirements for quantities of submittals and additional requirements.

1.6 WARRANTY

A. Warranty: The standby electric generating system components, complete engine-generator and instrumentation panel shall be warranted by the manufacturer against defective materials and factory workmanship for a period of 5 years. Such defective parts shall be repaired or replaced at the manufacturer’s option, free of charge. Travel and labor shall be included for the first 36 months. The warranty period shall commence when the standby power system is placed into service and accepted by the Owner or Owner’s Representative. Multiple warranties for individual components (engine, alternator, controls, etc.) will not be acceptable. Satisfactory warranty documents must be provided. Also, in the judgment of the specifying engineer, the manufacturer supplying the warranty for the complete system must have the necessary financial strength and technical expertise with all components supplied to provide adequate warranty support.

1.7 SERVICE CONTACT

A. Service: Supplier of the electric plant and associated items shall have permanent service facilities in this trade area. These facilities shall comprise a permanent force of factory trained service personnel on 24 hour call, experienced in servicing this type of equipment, providing warranty and routine maintenance service to afford the owner maximum protection. Delegation of this service responsibility for any of the equipment listed herein will not be considered fulfillment of these specifications. Service contracts shall also be available.

PART 2 - ENGINE-GENERATOR SET

2.1 ENGINE

A. The engine is to be cooled with a unit mounted radiator, fan, water pump, and closed coolant recovery system providing visual diagnostic means to determine if the system is operating with a normal engine coolant level. The radiator shall be designed for operation in 110 degrees f, 43 degrees c ambient temperature.

B. The intake air filter(s) with replaceable element must be mounted on the unit. Full pressure lubrication shall be supplied by a positive displacement lube oil pump. The engine shall have a replaceable oil filter(s) with internal bypass and replaceable element(s). Engine coolant and oil drain extensions, equipped with pipe plugs, must...
be provided to outside of the mounting base for cleaner and more convenient engine servicing. A fan guard must be installed for personnel safety.

C. The engine shall have a battery charging DC alternator with a transistorized voltage regulator. Remote 2-wire starting shall be by a solenoid shift, electric starter.

D. Engine speed shall be controlled by isochronous governor to maintain alternator steady state frequency within 0.25% from no load to full load alternator output. Steady state regulation is to be 0.5%.

E. The primary diesel fuel filter shall be capable of removing contaminants of 10 microns. Element shall be replaceable paper type.

F. The engine shall have (a) unit mounted, thermostatically controlled water jacket heater(s) to aid in quick starting. The wattage shall be as recommended by the manufacturer. The contractor shall provide proper branch circuit from normal utility power source.

G. Sensing elements to be located on the engine for low oil pressure shutdown, high engine temperature shutdown, low coolant level shutdown, overspeed shutdown, overcrank shutdown, remote E-stop shutdown and air shutdown damper when used. These sensors are to be connected to the control panel using a wiring harness with the following features: wire number labeling on each end of the wire run for easy identification, a molded rubber boot to cover the electrical connection on each sensor to prevent corrosion and all wiring to be run in flexible conduit for protection from the environment and any moving objects.

2.2 ALTERNATOR

A. The alternator shall be a 3 pole revolving field type, 12 lead, wired for 120/240vac 1 phase 3 wire, 60 hz, with a brushless exciter. Photosensitive components will not be permitted in the rotating exciter. The stator shall be direct connected to the engine to insure permanent alignment. The generator shall meet temperature rise standards for Class "H" insulation; operate within Class "F" standards for extended life. All leads must be extended into an AC connection panel. The alternator shall be protected by internal thermal overload protection and an automatic reset field circuit breaker.

B. One step load acceptance shall be 100% of engine-generator set nameplate rating and meet the requirements of NFPA 110 Paragraph 7.13.7. The generator set and regulator must sustain at least 90% of rated voltage for 10 seconds with 250% of rated load at near zero power factor connected to its terminals when equipped with direct or brushless excitation. 300% short circuit current must be selectable on units equipped with permanent magnet exciters. Generators equipped with permanent magnet exciters not allowing the selection of the short circuit current ratings are not allowed.

C. A solid state voltage regulator designed and built by the alternator manufacturer must be used to control output voltage by varying the exciter magnetic field to provide + or - 1% regulation during stable load conditions. Should an extremely heavy load drop the output frequency, the regulator shall have a voltage droop of 4 Volts/Hertz to maximize motor starting capability. The frequency at which this droop operation begins must be
adjustable, allowing the generator set to be properly matched to the load characteristics insuring optimum system performance. Additional rheostats for matching generator voltage, droop, and stability characteristics to the specific load conditions must be available.

D. A NEMA 1 panel that is an integral part of the generator set must be provided to allow the installer a convenient location in which to make electrical output connections. A fully rated, isolated neutral must be included by the generator set manufacturer to insure proper sizing.

E. The electric plant shall be mounted with vibration isolators on a welded steel base that shall permit suitable mounting to any level surface.

F. Provide the following items installed at the factory:
   1. A main line 400 amp, 2 pole, 80% rated, 600 volt rated, molded case type, generator mounted circuit breaker carrying the UL mark shall be factory installed. The breaker shall be rated per the manufacturer's recommendations. Circuit breaker shall be mounted in the genset connection box. The line side connections are to be made at the factory. Output lugs shall be provided for load side connections. A system utilizing manual reset field circuit breakers and current transformers is unacceptable.

2.3 CONTROLS

A. All engine alternator controls and instrumentation shall be designed, built, wired, tested and shock mounted in a NEMA 1 enclosure to the engine-generator set by the manufacturer. It shall contain panel lighting, a fused DC circuit to protect the controls and a +/-5% voltage adjusting control. This panel must be able to be rotated 90 degrees in either direction for correct installation.

B. The engine-generator set shall contain a complete 2 wire automatic engine start-stop control which starts the engine on closing contacts and stop the engine on opening contacts. A cyclic cranking limiter shall be provided to open the starting circuit after eight attempts if the engine has not started within that time. Engine control modules must be solid state plug-in type for high reliability and easy service.

C. The panel shall include; analog meters to monitor AC voltage, AC current and AC frequency with a phase selector switch, an emergency stop switch, an audible alarm, battery charger fuse, and a programmable engine control and monitoring module.

D. The programmable module shall include: a manual, off, auto switch; four LEDs to indicate 1) Not In Auto, 2) Alarm Active, 3) Generator Running, 4) Generator Ready; a data entry keypad and a digital display panel.

E. The module will display all pertinent unit parameters including:
   1. Generator Status
      a. Current unit status in real time
   2. Instrumentation
      a. Real time readouts of the engine and alternator analog values
         1) Oil pressure
2) Coolant temperature
3) Fuel level
4) DC battery voltage
5) Run time hours

3. Generator Commands
   a. Current engine start/stop status

4. Alarm Status (Safety Indications and Shutdowns as required by NFPA 110 Table 5.6.5.2 for the level of EPS being installed)
   a. Current alarm(s) condition
      1) Low oil pressure pre-alarm
      2) Low oil pressure
      3) Low coolant level
      4) Low water temperature
      5) Overcrank
      6) Overspeed
      7) Lamp test
      8) Contacts for local and remote common alarm
      9) Air shutdown damper when used
     10) High or low AC voltage
     11) High or low frequency
     12) High or low battery voltage
     13) High, low and critical low fuel levels
     14) *8 user programmable digital channels
     15) *4 user programmable analog channels

5. Alarm Log
   a. Memory of last fifty alarm events

6. Operating parameters
   a. Access to and manipulation of the current operating parameters and alarm limits

7. Software Information
   a. Version information and module display test function

F. The panel must be accessible by PC based software via either standard RS232, RS485 or modem. The software must display the module face, be updated in real time and allow for complete access to all module functions. Communication output and its software must be fully compatible and allow for incorporation in the system control program.

G. The following equipment is to be installed at the engine-generator set manufacturer's facility:
   1. A DPDT relay shall be socket mounted in the generator control panel and operate on engine start and run for customer connection.

H. The following equipment is to be provided by the engine-generator set manufacturer and shipped loose with the unit:
   1. A (20) light remote annunciator panel flush mounted where shown on drawings.
   2. A weather proof tamper resistant remote emergency power off (EPO/E-Stop) mushroom type push button labeled “Generator Emergency Stop”.

26 32 13 - 6 Generator System
2.4 UNIT ACCESSORIES

A. The following equipment is to be installed at the engine-generator set manufacturer's facility:

1. Weather Protective Enclosure: The engine-generator set shall be factory enclosed in a sound attenuated weather housing. The enclosure is to have large, hinged doors to allow access to the engine, alternator and control panel. The doors must lift off without the use of tools. Each door will have stainless steel hinges and locking hardware with identical keys. Padlocks do not meet this specification. The exhaust silencer(s) shall be provided of the size as recommended by the manufacturer and shall be of critical grade. It shall be connected to the engine with a flexible, seamless, stainless steel exhaust connection. A rain cap will terminate the exhaust pipe. All components must be properly sized to assure operation without excessive back pressure when installed. Enclosure shall have an externally mounted emergency stop button.

2. A heavy duty, lead acid battery set rated at 90AH (27F) shall be installed by the generator set manufacturer. Provide all intercell and connecting battery cables as required.

3. Provide a 2 amp automatic float battery charger manufactured by the engine-generator set supplier. It is to be of a solid state design and self-regulating to prevent overcharging the system battery. The battery charger is to be factory installed on the generator set. Due to line voltage drop concerns, a battery charger mounted in the transfer switch will be unacceptable.

B. The following equipment is to be provided by the engine-generator set manufacturer and shipped loose with the unit:

1. Spring type vibration isolators to mount between the mounting base and pad to reduce noise and transmitted vibrations shall be supplied by the manufacturer.

2. Normal fuel venting kit to minimum 12 feet above grade, in compliance with CFC 3404.2.7.3.3.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Contractor shall install the complete electrical generating system including the indicated shipped-loose accessories and all fuel connections in accordance with the manufacturer's recommendations as reviewed by the Engineer.

B. Contractor shall provide complete conduit infrastructure for power and low voltage/communications wiring to generator system and all accessories.

3.2 STARTUP AND CHECKOUT

A. The supplier of the electric generating plant and associated items covered herein shall provide factory trained technicians to checkout the completed installation and to perform an initial startup inspection to include:
1. Provide all required fluids (oil, coolant, lubricants, and fuel) and ancillary equipment for full function of the Emergency Power Supply.
2. Ensuring the engine starts (both hot and cold) within the specified time.
3. Verification of engine parameters within specification.
4. Verify no load frequency and voltage, adjusting if required.
5. Test all automatic shutdowns of the engine-generator.
6. Perform a 4 hour load test of the electric plant, per NFPA 110 Section 7.13. Observe and record results of test in the presence of the AHJ / IOR. Provide a portable load bank, cables and connections as required to conform to testing requirements. Correct defects which become evident during this test. Supply fuel for test. Include the complete emergency system (consisting of generator, emergency distribution equipment and automatic transfer switches, and the like) in final test operations. Top off fuel tank at end of test.
7. Include 4 hour on-site meeting / training with Owner's representative prior to final acceptance. Schedule training with Owner (minimum) one week in advance by mutual agreement of Owner and manufacturers representative.

END OF SECTION 26 32 13
SECTION 26 36 23
AUTOMATIC TRANSFER SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:
   1. Furnish and install automatic transfer switches (ATS) with number of poles, amperage, voltage, and withstand current ratings as shown on the plans. Each automatic transfer shall consist of an inherently double throw power transfer switch unit and a microprocessor controller, interconnected to provide complete automatic operation. All transfer switches and control panels shall be the product of the same manufacturer.

1.3 ACCEPTABLE MANUFACTURERS

A. Automatic transfer switches shall be ASCO Series 300. Any alternate switch or manufacturer shall meet and follow the general conditions procedure for substitution, and be in all respects compatible with the generator and switchgear as described and as depicted on the plans. Each alternate bid must list any and all deviations from this specification.

1.4 SUBMITTALS

A. Submit in accordance with Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.

1.5 CODES AND STANDARDS

A. The automatic transfer switches and accessories shall conform to the requirements of:
   1. UL 1008 - Standard for Automatic Transfer Switches
   2. NFPA 70 - National Electrical Code and California Electrical Code (CEC)
   3. NFPA 110 - Emergency and Standby Power Systems
   4. IEEE Standard 446 - IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
2.1 MECHANICALLY HELD TRANSFER SWITCH

A. The transfer switch unit shall be electrically operated and mechanically held. The electrical operator shall be a single-solenoid mechanism, momentarily energized. Main operators which include overcurrent disconnect devices will not be accepted. The switch shall be mechanically interlocked to ensure only one of two possible positions, normal or emergency.

B. The switch shall be positively locked and unaffected by momentary outages so that contact pressure is maintained at a constant value and temperature rise at the contacts is minimized for maximum reliability and operating life.

C. All main contacts shall be silver composition.

D. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. A manual operating handle shall be provided for maintenance purposes. The handle shall permit the operator to manually stop the contacts at any point throughout their entire travel to inspect and service the contacts when required.

E. Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof which are not intended for continuous duty, repetitive switching or transfer between two active power sources are not acceptable.

F. Where neutral conductors are to be solidly connected, a neutral terminal plate with fully-rated AL-CU pressure connectors shall be provided.

2.2 MICROPROCESSOR CONTROLLER WITH MEMBRANE INTERFACE PANEL

A. The controller shall direct the operation of the transfer switch. The controller’s sensing and logic shall be controlled by a built-in microprocessor for maximum reliability, minimum maintenance, and inherent serial communications capability. The controller shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance.

B. The controller shall be enclosed with a protective cover and be mounted separate from the transfer switch unit for safety and ease of maintenance. Sensing and control logic shall be provided on printed circuit boards. Interfacing relays shall be industrial grade plug-in type with dust covers.
C. The controller shall meet or exceed the requirements for Electromagnetic Compatibility (EMC) as follows:
1. ANSI C37.90A/IEEE 472 Voltage Surge Test
2. NEMA ICS – 109.21 Impulse Withstand Test
3. IEC801-2 Electrostatic discharge (ESD) immunity
4. ENV50140 and IEC 801 – 3 Radiated electromagnetic field immunity
5. IEC 801 – 4 Electrical fast transient (EFT) immunity
6. ENV50142 Surge transient immunity
7. ENV50141: Conducted radio-frequency field immunity
8. EN55011: Group 1, Class A conducted and radiated emissions
9. EN61000 –4 – 11 Voltage dips and interruptions immunity

2.3 ENCLOSURE

A. The ATS shall be furnished in a NEMA type 3R enclosure unless otherwise shown on the plans.

B. Controller shall be flush-mounted display with LED indicators for switch position and source availability. It shall also include test and time delay bypass switches.

PART 3 - OPERATION

3.1 VOLTAGE AND FREQUENCY SENSING

A. The voltage of each phase of the normal source shall be monitored, with pickup adjustable to 95% of nominal and dropout adjustable from 70% to 90% of pickup setting.

B. Single-phase voltage and frequency sensing of the emergency source shall be provided.

3.2 TIME DELAYS

A. An adjustable time delay shall be provided to override momentary normal source outages and delay all transfer and engine starting signals.

B. An adjustable time delay shall be provided on transfer to emergency, adjustable from 0 to 5 minutes for controlled timing of transfer of loads to emergency.

C. An adjustable time delay shall be provided on retransfer to normal, adjustable to 30 minutes. Time delay shall be automatically bypassed if emergency source fails and normal source is acceptable.

D. A 5-minute cool down time delay shall be provided on shutdown of engine generator.

E. All adjustable time delays shall be field adjustable without the use of tools.
3.3 ADDITIONAL FEATURES

A. A set of gold-flashed contacts rated 10 amps, 32 VDC shall be provided for a low-voltage engine start signal. The start signal shall prevent dry cranking of the engine by requiring the generator set to reach proper output, and run for the duration of the cool down setting, regardless of whether the normal source restores before the load is transferred.

B. A push-button type test switch shall be provided to simulate a normal source failure.

C. A push-button type switch to bypass the time delay on transfer to emergency, the engine exerciser period on the retransfer to normal time delay whichever delay is active at the time the push-button is activated.

D. Terminals shall be provided for a remote contact which opens to signal the ATS to transfer to emergency and for remote contacts which open to inhibit transfer to emergency and/or retransfer to normal.

E. Auxiliary contacts, rated 10 amps, 250 VAC shall be provided consisting of one contact, closed when the ATS is connected to the normal source and one contact, closed, when the ATS is connected to the emergency source.

F. Indicating lights shall be provided, one to indicate when the ATS is connected to the normal source (green) and one to indicate when the ATS is connected to the emergency source (red). Also provide indicating lights for both normal and emergency source availability.

G. Terminals shall be provided to indicate actual availability of the normal and emergency sources, as determined by the voltage sensing pickup and dropout settings for each source.

H. Engine Exerciser - An engine generator exercising timer shall be provided, including a selector switch to select exercise with or without load transfer.

I. Inphase Monitor - An Inphase monitor shall be inherently built into the controls. The monitor shall control transfer so that motor load inrush currents do not exceed normal starting currents, and shall not require external control of power sources. The inphase monitor shall be specifically designed for and be the product of the ATS manufacturer.

J. Selective Load Disconnect - A double throw contact shall be provided to operate after a time delay, adjustable to 20 seconds prior to transfer and reset 0 to 20 seconds after transfer. This contact can be used to selectively disconnect specific load(s) when the transfer switch is transferred. Output contacts shall be rated 6 amps at 28 VDC or 120 VAC.

K. Communications Interface - Serial Module (5110) to allow local or remote communications with ASCO PowerQuest or Siteweb communication products. To connect Series 300 Automatic Transfer Switches, and ASCO ATS Annunciators to the serial network via an RS485 interface (Accessory 72A) shall be routed to Ethernet portion in building.
L. Programmable Engine Exerciser - A seven or fourteen day programmable engine exerciser with digital readout display. Shall include one form C contact for availability of normal and emergency. Include “with or without” load control switch for exerciser period. The exerciser shall be backed up by a permanent battery. (Accessory 11BG).

PART 4 - ADDITIONAL REQUIREMENTS

4.1 WITHSTAND AND CLOSING RATINGS

A. The ATS shall be rated to close on and withstand the available rms symmetrical short circuit current at the ATS terminals with the type of overcurrent protection shown on the plans. WCR ATS ratings as be as follows when used with specific circuit breakers:

<table>
<thead>
<tr>
<th>ATS Size</th>
<th>Withstand &amp; Closing Rating MCCB</th>
<th>W/CLF</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>42,000A</td>
<td>200,000</td>
</tr>
</tbody>
</table>

4.2 TESTS AND CERTIFICATION

A. The complete ATS shall be factory tested to ensure proper operation of the individual components and correct overall sequence of operation and to ensure that the operating transfer time, voltage, frequency and time delay settings are in compliance with the specification requirements.

B. Upon request, the manufacturer shall provide a notarized letter certifying compliance with all of the requirements of this specification including compliance with the above codes and standards, and withstand and closing ratings. The certification shall identify, by serial number(s), the equipment involved. No exceptions to the specifications, other than those stipulated at the time of the submittal, shall be included in the certification.

C. The ATS manufacturer shall have third party certification verifying quality assurance in design/development, production, installation and servicing in accordance with ISO 9001.

4.3 SERVICE REPRESENTATION

A. The ATS manufacturer shall maintain a national service organization of company-employed personnel located throughout the contiguous United States. The service center's personnel must be factory trained and must be on call 24 hours a day, 365 days a year.

B. The manufacturer shall maintain records of each switch, by serial number, for a minimum of 20 years.

C. For ease of maintenance and parts replacement, the switch nameplate shall include drawing numbers, part numbers for main coil and control.
END OF SECTION 26 36 23
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:
   1. lighting systems, including luminaires, ballasts, lamps and emergency lighting equipment.

B. Related Work:
   1. Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.
   2. Section 26 05 33, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS: Conduits, fittings, and boxes for raceway systems.
   3. Section 26 05 19, LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Low voltage power and lighting wiring.
   4. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.
   5. Section 26 56 70, LIGHTING ACCEPTANCE TESTING.

1.3 SUBMITTALS

A. Submit in accordance with Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.

B. Shop Drawings:
   1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
   2. Include electrical ratings, dimensions, mounting, details, materials, terminations, wiring and connection diagrams, photometric data, ballasts, luminaires, lamps and controls.
1.4 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements) form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.


C. American National Standards Institute (ANSI).

D. Aluminum Association Inc. (AA).

E. Illuminating Engineering Society of North America (IESNA).

F. National Electrical Manufacturers Association (NEMA).

G. National Fire Protection Association (NFPA).

H. Underwriters Laboratories, Inc. (UL).

1.5 DEFINITIONS

A. Lighting terminology used herein is defined in IES.

B. Exception: The term “driver” is used herein to cover both drivers and power supplies, where applicable.

C. Clarification: The term “LED light source(s)” is used herein per IES to cover LED package(s), module(s), and array(s).

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Materials and equipment shall be in accordance with CEC, UL, ANSI, and as shown on the drawings and specified.

2.2 LIGHTING FIXTURES (LUMINAIRES)

A. Shall be in accordance with NFPA 70, UL 1598 and shall be as shown on drawings and as specified. All luminaires shall have been certified to the California Energy Commission by its manufacturer to comply with the efficiency standards as per California Code of Regulations Title 24, Part 6, Section 111 referencing the Appliance Efficiency Regulations in Title 20. Post certification with building permit.

B. Sheet Metal:
1. Shall be formed to prevent warping and sagging. Housing, trim and lens frame shall be true, straight (unless intentionally curved) and parallel to each other as designed.
2. Wireways and fittings shall be free of burrs and sharp edges and shall accommodate internal and branch circuit wiring without damage to the wiring.
3. When installed, any exposed fixture housing surface, trim frame, door frame and lens frame shall be free of light leaks; lens doors shall close in a light tight manner.
   a. Hinged door closure frames shall operate smoothly without binding when the fixture is in the installed position, and latches shall function easily by finger action without the use of tools.

C. Ballasts shall be serviceable while the fixture is in its normally installed position, and shall not be mounted to removable reflectors or wireway covers.

D. Recessed fixtures shall be of the type approved for the ceiling and insulation conditions and appropriate for the installation location. Insulation must be held back from the fixture to provide manufacturers’ recommended clearances for proper operation. Thermal tripping shall be the installer’s responsibility to correct. Where installed in fire rated ceilings, coordinate installation of fire rated enclosures around the ceiling penetrations. Fixtures shall contain the proper through wiring capacity for that which is shown on the plans.

E. Recessed fixtures shall be provided with the appropriate trims and hardware compatible with the ceiling type shown. Plaster frames are required where plaster or gypsum board ceilings are encountered.

F. Mechanical Safety: Lighting fixture closures (lens doors, trim frame, hinged housings, etc.) shall be retained in a secure manner by captive screws, chains, captive hinges or fasteners such that they cannot be accidentally dislodged during normal operation or routine maintenance.

G. Metal Finishes:
   1. The manufacturer shall apply standard finish (unless otherwise specified) over a corrosion resistant primer, after cleaning to free the metal surfaces of rust, grease, dirt and other deposits. Edges of pre-finished sheet metal exposed during forming, stamping or shearing processes shall be finished in a similar corrosion resistant manner to match the adjacent surface(s). Fixture finish shall be free of stains or evidence of rusting, blistering, or flaking.
   2. Interior light reflecting finishes shall be white with not less than 85 percent reflectances, except where otherwise specified on the drawing.
   3. Exterior finishes shall be as shown on the drawings.

H. Provide all lighting fixtures with a specific means for grounding metallic wireways and housings to an equipment grounding conductor.

I. Light Transmitting Components for Fluorescent Fixtures:
   1. Shall be 100 percent virgin acrylic plastic or water white, annealed, crystal glass.
2. Flat lens panels shall have not less than 1/8 inch of average thickness. The average thickness shall be determined by adding the maximum thickness to the minimum unpenetrated thickness and dividing the sum by 2.

3. Unless otherwise specified, lenses, diffusers and louvers shall be retained firmly in a metal frame by clips or clamping ring in such a manner as to allow expansion and contraction of the lens without distortion or cracking.

J. Recessed compact fluorescent or LED fixtures shall be manufactured specifically for compact fluorescent or LED lamps with ballasts or drivers integral to the fixture. Assemblies designed to retrofit fixtures are prohibited except when described in this fashion. Fixtures shall be designed for lamps as specified.

K. Provide wire lamp guard on all exposed lamp fixture/luminaires.

L. Provide fixtures with a U.L. listing for shower or shower rating above shower or tub areas.

2.3 LED LUMINAIRE REQUIREMENTS

A. General Requirements:
   1. Luminaire shall have an external label per ANSI C136.15
   2. Luminaire shall have an internal label per ANSI C136.22.
   3. Luminaires shall start and operate in -20°C to +40°C ambient.
   4. LED light source(s) and driver(s) shall be RoHS compliant.

2.4 EMERGENCY FLUORESCENT LAMP POWER SUPPLY

A. Self-contained battery-operated power supply for a minimum output of 90 minutes.

B. The power supply shall be installed within the luminaire ballast compartment or wireway. Provide with test switch and charge indicator installed integral to the luminaire. The test switch and charge indicator may be installed in a remote ceiling mounted flush J-box for recessed downlights which cannot accept integral components.

2.5 LED DRIVER

A. Driver
   1. Rated case temperature shall be suitable for operation in the luminaire operating in the ambient temperatures as indicated.
   2. Shall accept the voltage or voltage range indicated, and shall operate normally for input voltage fluctuations of plus or minus 10 percent. Consistent with NEMA SSL 1.
   3. Shall have a minimum Power Factor (PF) of 0.90 at full input power and across specified voltage range.

B. Electromagnetic interference
1. Shall have a maximum Total Harmonic Distortion (THD) of 20% at full input power and across specified voltage range.


C. The following shall be in accordance with corresponding sections of ANSI C136.37
   1. Wiring and grounding
   2. All internal components shall be assembled and pre-wired using modular electrical connections.
   3. Mounting provisions
   4. Terminal blocks for incoming AC lines
   5. Latching and hinging
   6. Ingress protection

2.6 POLES

A. General:
   1. Poles shall be steel or aluminum as specified in fixture schedule and as shown on the drawings. Finish shall be as approved by the Architect. Assume custom color for bidding.
   2. The pole and arm assembly shall be designed for wind load of 100 miles per hour, with an additional 30 percent gust factor, supporting luminaire(s) having the effective projected areas indicated as per manufacturer data.
   3. Poles shall anchor-bolt type designed for use with underground supply conductors. Poles cover shall be secured by stainless steel captive screws.
   4. Provide a steel grounding stud opposite hand hole openings.

B. Provide a base cover matching the pole in material and color to conceal the mounting hardware pole-base welds and anchor bolts.

C. Hardware: All necessary hardware shall be 300 series tamperproof stainless steel.

D. Types:
   1. Aluminum: Provide aluminum poles manufactured of corrosion resistant AA AAH35.1 aluminum alloys conforming to AASHTO LTS-4 for Alloy 6063-T6 or Alloy 6005-T5 for wrought alloys, and Alloy 356-T4 (3,5) for ASTM B108-01 cast alloys. Poles shall be seamless extruded or spun seamless type. Provide a pole grounding connection designed to prevent electrolysis when used with copper ground wire. Base covers for aluminum poles shall be cast from 356-T6 aluminum alloy in accordance with ASTM B108-01.
   2. Steel: Provide steel poles having minimum 11-gage steel with minimum yield/strength of 48,000 psi and iron-oxide primed factory finish. Base covers for steel poles shall be structural quality hot-rolled carbon steel plate having a minimum yield of 36,000 psi.
2.7 FOUNDATIONS FOR POLES

A. Foundations shall be cast-in-place concrete.

B. Foundations shall support the effective projected area of the specified pole, arm(s), luminaire(s), and all accessories specified under wind conditions as specified in this section.

C. Place concrete in spirally wrapped treated paper forms for round foundations, and construct forms for square foundations.

D. Rub-finish and round all above-grade concrete edges to approximately 1/4” radius unless otherwise detailed.

E. Concrete shall have 3000 psi minimum 28 day compressive strength.

F. Anchor bolt assemblies and reinforcing of concrete foundations shall be as shown on the drawings and meet ACI 318. Anchor bolts shall be in a welded cage or properly positioned by the tie wire to stirrups.

G. Install a copperclad ground rod, not less than 5/8” diameter by 8’ long in pullbox adjacent to each fixture. Where rock or layered rock is present, drill a hole not less than 2” in diameter and 6’ deep, backfill with tamped fine sand and drive the rod into the hole. Bond the rod to the pole with not less than number 6 AWG bare copper wires. The method of bonding shall be approved for the purpose.

H. After leveling of pole grout base solid between plate and footing with dry pack concrete for vibration reduction.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation and furnishing of lighting fixtures shall be in accordance with the CEC, manufacturer’s instructions and as shown on the drawings or specified. Fixtures damaged in transit and storage prior to completion shall be replaced at Contractor’s expense.

B. Align, mount and level the lighting fixtures uniformly.

C. Avoid interference with and provide clearance for equipment. Where the indicated locations for the lighting fixtures conflict with the locations for equipment, change the locations for the lighting fixtures by the minimum distances necessary as approved by the Architect. The Architectural reflected ceiling plan will take precedence over electrical plans.
D. For suspended lighting fixtures, the mounting heights shall provide the clearances between the bottoms of the fixtures and the finished floors as shown on the drawings.

E. Lighting Fixture Supports:
1. Contractor shall provide support for all of the fixtures independent of suspended ceilings. Supports may be anchored to channels of the ceiling construction, to the structural slab or to structural members within a partition, or above a suspended ceiling.
2. Shall maintain the fixture positions after cleaning and relamping.
3. Shall support the lighting fixtures without causing the ceiling or partition to deflect.
4. Hardware for recessed fluorescent fixtures:
5. Fixtures shall be supported as detailed on drawings and as required by DSA standards.
6. Installation: Fixtures shall be securely mounted on ceilings and walls with appropriate fastening devices. "Drop-in" type T-bar fixtures shall be secured with #12 gauge safety "earthquake wires" as described by California Code of Regulations Title 24 Part 2, Chapter 47. "Earthquake clips" will be required for fastening to the T-bar system in addition to safety wire. Surface mounted fluorescent fixtures shall be solidly screwed or clipped into framing above drywall with 4-#10 sheet metal screws into each fixture. Provide blocking for screw supports behind all surface mounted lighting fixtures weighing more than 15 lbs.
7. Surface mounted lighting fixtures:
a. Fixtures shall be bolted against the ceiling independent of the outlet box at four points spaced near the corners of each unit. The bolts shall be minimum ¼-20 bolt, secured to structural ceiling. Non-turning studs may be attached to the building structure by 12 gauge safety hangers.
8. Fixtures mounted in open construction shall be secured directly to the building structure with approved bolting and clamping devices.
9. Single or double pendent mounted lighting fixtures:
a. Each stem shall be supported by an approved outlet box, mounted swivel joint and canopy which holds the stem captive and provides spring load (or approved equivalent) dampening of fixture oscillations. Outlet box shall be supported vertically from the building structure and be allowed to swing to a 45 degree angle.
10. Outlet boxes for support of lighting fixtures (where permitted) shall be secured directly to the building structure with approved devices or supported vertically in a hung ceiling from the building structure with a nine gauge wire hanger, and be secured by an approved device to a main ceiling runner or cross runner to prevent any horizontal movement relative to the ceiling.

F. Furnish and install the specified lamps for all lighting fixtures as part of this project.

G. Coordinate between the electrical and ceiling trades to ascertain that approved lighting fixtures are furnished in the proper sizes and installed with the proper devices (hangers, clips, trim frames, flanges), to match the ceiling system being installed.

H. At completion of project, relamp all fixtures which have failed/burned-out lamps. Clean all fixtures, lenses, diffusers and louvers that have accumulated dust/dirt during construction.
I. Provide unswitched leg of interior lighting branch circuit to integral emergency battery pack light fixtures, exit signs and night lights as applicable per lighting plans.

J. Wallmount fixtures in walkway areas shall not project more than 4 inches from wall when projection occurs lower than 80 inches.

K. Poles:
   1. Provide pole foundations with galvanized steel anchor bolts, threaded at the top end and bent 1.57 rad 90 degrees at the bottom end. Provide galvanized nuts, washers, and ornamental covers for anchor bolts. Thoroughly compact backfill with compacting arranged to prevent pressure between conductor, jacket, or sheath and the end of conduit elbow. Adjust poles as necessary to provide a permanent vertical position with the bracket arm in proper position for luminaire location.
   2. After the poles have been installed, shimmed and plumbed, grout the spaces between the pole bases and the concrete base with non-shrink concrete grout material. Provide a plastic or copper tube, of not less than 3/8" inside diameter, through the grout tight to the top of the concrete base for moisture weeping.
   3. Attach pole base cover to pole flange with set screws.

L. Foundation Excavation: Depth shall be as indicated on drawings. Dig holes large enough to permit the proper use of tampers to the full depth of the hole. Place backfill in the hole in 6" maximum layers and thoroughly tamp. Place surplus earth around the pole in a conical shape and pack tightly to drain water away.

3.2 GROUNDING

A. Ground noncurrent-carrying parts of equipment including metal poles, luminaries, mounting arms, brackets, and metallic enclosures as specified in Section 26 0526, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS. Where copper grounding conductor is connected to a metal other than copper, provide specially treated or alloyed connectors suitable and listed for this purpose.

END OF SECTION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:
   1. The Contractor shall be responsible for the Certificate of Acceptance, but coordinate with the Certified California Lighting Controls Test Technician to assure that all required documents have been filed with and approved by the enforcement agency prior to receiving a final occupancy permit. The Certificate of Acceptance will indicate that the Contractor has demonstrated acceptance requirements of the plans and specifications, that current requirements for installation certificates are met, and that currently required operating and maintenance information (as well as the Certificate of Acceptance) were provided to the building Owner.
   2. Testing, evaluation and calibration of lighting controls equipment provided, installed and connected in Division 26.
   3. Documentation of test results, completion of “Certificate of Acceptance” and “Certificate of Installation” forms and filing with the enforcement agency for approval.
   4. Specific Jobsite Conditions:
      a. Acceptance testing must be tailored for each specific design, job site, and climactic conditions. While the steps for conducting each test remain consistent, the application of the tests to a particular site may vary. The Contractor shall review the construction documents and include all required time, material, testing equipment, etc. as required to complete the requirements of this section.

B. Related Work:
   1. Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.
   2. Section 26 51 00, LIGHTING.

1.3 REFERENCES

1.4 SYSTEM DESCRIPTION

A. Performance Requirements:
   1. All material, equipment, labor and technical supervision to perform tests, calibrations and documentation specified herein.

B. Scope of Testing, Evaluation and Calibration (as applicable):
   1. Automatic (master) time switches.
   2. Occupancy sensors.
   3. Automatic daylighting controls.
   4. Photo electric sensors.
   5. Daylighting controls.
   6. Outdoor astronomical time switches.
   7. Area controls.

1.5 SUBMITTALS

A. Submit in accordance with Section 26 0500, COMMON WORK RESULTS FOR ELECTRICAL.

B. Test Reports:
   1. Written record of all tests and completion of forms included in this section.
   2. At completion of project, assemble a final test report. Submit report to the enforcement agency and the Owner prior to final occupancy to include:
      a. Summary of project.
      b. Description of systems and equipment tested.
      c. Visual inspection report.
      d. Description of tests.
      e. Test results.
      f. Conclusions and recommendations.
   3. Report shall be bound in booklet form, include on the Contractor’s letterhead the title of the report and the systems tested.

C. Constructability Plan Review
   1. The Contractor shall review the construction drawings and specifications to understand the scope of the acceptance tests and raise critical issues that might affect the success of the acceptance tests prior to starting construction. Any constructability issues associated with the lighting system should be forwarded to the design team for review/modifications prior to equipment procurement and installation. The Contractor shall submit on company letterhead, with the lighting control equipment required by Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL, 1.4B, a letter confirming that the constructability review has been completed and their company has reviewed and is prepared to complete the lighting acceptance testing required by this section.
PART 2 - PRODUCTS

2.1 FORMS

A. Lighting Installation forms and verification procedures for lighting systems that require acceptance testing can be downloaded from the following website: www.energy.ca.gov/2015publications/CEC-400-2015-033/appendices/forms/NRCI

B. Lighting Acceptance forms are to be provided by a Certified California Lighting Controls Acceptance Test Technician. The California Energy Commission adopted changes to the California building Efficiency Standards (Title 24, Parts 1 and 6) that require lighting controls and devices to be certified as properly installed and operational, prior to issuance of occupancy permits. All Acceptance Technicians must be employed by an Acceptance Test employer that provides support as well as quality control. Certified California Lighting Controls Acceptance Test Technicians can be found at the following website: www.calctp.org/acceptance-technicians/contractors

C. These completed forms will be the deliverable product to the enforcement agency and Owner as described in 1.4 of this section.

PART 3 - EXECUTION

3.1 FIELD QUALITY CONTROL

A. Tests:
   1. Contractor's Responsibilities:
      a. Perform all required tests required by this section.
      b. Schedule testing with building Owner.
      c. Provide Installation forms
      d. Acceptance forms provided by California Certified Lighting Controls Technician hired by Contractor.
      e. Calibration of equipment such as light meters, photo electric controls, etc.
      f. Programming of time switches (interior/exterior lighting) for operations as directed by the Owner.

3.2 ADJUSTING

A. Final Settings: The Contractor shall be responsible for implementing all final settings and adjustments on controls equipment as required for a complete and operating system.

END OF SECTION 26 56 70
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section Includes:
   1. Provide a complete sprinkler monitoring and alarm system. The system shall be connected, tested, verified by the Authority Having Jurisdiction (AHJ) to be acceptable and left in first-class operating condition. All equipment herein specified shall be engineer-approved and California State Fire Marshal (CSFM) listed. The entire installation shall conform to the National Fire Protection Association (NFPA) Standard 72, 90A & CEC Article 760 and authorities having jurisdiction as applicable. The system specified and depicted on the plan is a complete and approved system. Substitution of system components or manufacturer will require the contractor to separately obtain approval with the CSFM at Contractor’s expense and shall meet all requirements of the system as designed and pre-approved. Any routing of the system wiring that is significantly different than shown on the approved drawings shall have the approval of the engineer and must be obtained prior to construction.
   2. Provide all work and material as shown and / or required to provide a fully functional and adequate system as described herein and as required by the AHJ.
   3. Supervision: The system shall monitor the integrity of all alarm initiating and indicating appliance circuits and provide local and remote status of all connected systems. The system shall be provided with automatically charged standby batteries to maintain system operation for 24 HRS in the normal supervisory mode and 5 minutes of alarm. Batteries shall be supervised for connection to the system and low voltage threshold. The automatic battery charger shall be capable of charging fully discharged system batteries to 100% in 8 hours.
   4. The system wiring and installation shall be as stated in drawings and as required by the manufacturer. All wiring shall be color coded, tagged and verified to assure that it is free from shorts and grounds and shall be rated for the appropriate environmental conditions such as well locations.
   5. Testing: The completed system shall be tested in accordance with NFPA Standard 72-7-1.
   6. Warranty: The equipment and wiring shall be warranted to be free from electrical and mechanical defects for a period of two (2) years commencing with final acceptance by Owner.
7. All wiring shown in drawings shall be installed in conduit.

8. System Operation shall include:
   a. Separate zone signaling and device status indication for all initiating devices.
   b. Audible to sound the California uniform fire alarm signal in temporal mode. Devices shall be at least 15dBA above average ambient sound level or 5dBA above the maximum sound level having a duration of not less than 60 seconds, whichever is greater, in every occupiable space within the building. The maximum sound pressure level for audible alarm notification devices shall be 110dBA at the minimum hearing distance from the audible appliance. Where the average ambient noise is greater than 95dBA, visual alarm notification shall be provided in accordance with NFPA 72 and the audible alarm notification appliances shall not be required.
   c. Supervision of all circuits to indicate any abnormal wiring condition.
   d. One (1) N.O./N.C. integral relay for external device interface or as indicated on drawings.
   e. Central station connection capable of indicating (3) distinct separate signals as being tamper, trouble and alarm with point reporting capabilities.

9. All work shall be completed as shown on the plans and or as specified within this specification and shall include the following (but is not limited to):
   a. Furnishing and installation of equipment and devices.
   b. Conductors, connections and interconnections where specified and all in conduit system.
   c. Testing, cleaning and adjusting of completed work.
   d. Wiring diagrams, as-built drawings and three (3) sets of equipment operations and maintenance instructions for Owner.
   e. All work and material for complete and operable systems as indicated or specified.
   f. Permits, inspections and fees.
   g. Identification and instruction to Owner Representative.
   h. Coordination with Section 26 05 33, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.
   i. Furnishing of special back boxes where required for installation of devices.

10. Mechanical system duct detectors shall interface with fire alarm system without additional or special control devices.

11. All conductors to be installed in conduit pursuant to Specification Section 26 0533, RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS.

12. Qualifications: Contractor shall receive written approval and verified test results which shall be submitted to the Owner for system from manufacturers recognized representative prior to completion and acceptance.

13. All initiating devices shall be separately addressed for individual identification at control panel.

14. As-Built Drawings: A complete set of reproducible “as-built” drawings showing installed wiring, color coding, wire tag notations exact locations of all installed equipment, specific interconnections between all equipment and internal wiring of the equipment shall be delivered to the owner upon completion of the system.

15. Maintenance Instructions: Three (3) submittals of maintenance instructions shall be provided and shall be complete, easy to read, understandable and shall provide the following information:
a. Instructions for replacing any components of the system, including internal parts.
b. Instructions for periodic cleaning and adjustments of equipment with a schedule of these functions.
c. A complete list of all equipment and components with information as to the address and telephone number of both the manufacturer and local supplier of each item.
d. User operating instructions shall be prominently displayed on a separate sheet located next to the control unit in accordance with UL Standard 864. The contractor shall warrant all equipment and wiring free from inherent mechanical and electrical defects for two years from the date of final acceptance.

1.3 SUBMITTALS

A. Submit in accordance with Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL.

B. The submittal shall include certification from the manufacturer verifying that the distributor is an authorized agent, who is qualified and trained by the manufacturer in the proper installation, operation and service of the system.

C. Shop Drawings:
   1. A complete list of all supplied equipment including model numbers with catalog data sheets on each component and CSFM number.
   2. Provide schematic layout, floor plan, drawings indicating location of all components and equipment, required size and location of conduit and outlets and type and quantity of system conductors. Include voltage drop calculations and battery calculations based on actual number of devices to be installed.
   3. Include wiring diagrams for overall system and components including control panels, annunciators, power supplies, initiating circuits, notification appliances, control devices and FATC. Address numbers shall be noted on all appliances.
   4. Include physical and electrical characteristics of equipment to indicate conformance with the Specifications.
   5. Describe system characteristics and function as well as device wiring diagrams.
   6. Voltage drop and battery calculations for each control panel and power supply and initiating circuits.
   7. System operational matrix.

D. Data Sheets: Show California State Fire Marshal Listing, U.L. listing, equipment ratings, dimensions and finishes.

E. Manufacturer's Certificate: Note whether the system meets or exceeds specified requirements.

F. Operating and Maintenance Instruction Manual:
   1. Manual shall include the following tailored to this specific project:
      a. Operational description.
      b. Coded cabling plan.
c. Two wire circuit diagrams.
d. Wiring destination schedule.
e. Schematic component diagrams and PC board layouts.
f. Maintenance and alignment procedures.
g. Voltage drop and battery calculations.

1.4 COORDINATION

A. Refer to the electrical and mechanical drawings and specifications to determine quantities and location of devices and required scope of work and coordinate work with mechanical and electrical installers. Provide function described under mechanical section Sequence of Control, for fire and/or emergency conditions. Submit proposed interconnection to elevator supplier. Submit conduit and pathing requirements to electrical installer. For self-contained door release, coordinate with door supplier.

1.5 SYSTEM DESCRIPTION

A. General: System to be listed by Underwriters Laboratories and the California State Fire Marshal, designed to meet the functional requirements of NFPA 72A, 72B and 72D.

1.6 SYSTEM OPERATION

A. Wiring, equipment and devices for alarm initiation, annunciation, and audible signaling to be continuously supervised for opens, shorts or grounds (trouble). Each alarm initiating device circuit to be provided with illuminated and audible annunciation of both trouble and alarm conditions. Non-illumination indicates a normal condition.

B. Any alarm or trouble condition shall sound an audible signal at the panel and the remote annunciator. Signal shall be silenced by a momentary contact switch which shall transfer the signal to a visual indicator. Subsequent trouble conditions shall cause the signal to resound and in turn may be silenced. Upon restoration to normal, the trouble signal silencing indicator shall extinguish automatically.

C. Activation of any automatic or manual alarm initiating device shall cause the following to occur (where applicable):
   1. Sound an audible alarm and illuminate the visual indicator for zone and type of alarm at the fire command center, the remote annunciator and fire alarm control panel.
   2. Sound, at building of origin, the audible alarm signal over the system audible device(s).
   3. Transmit signal to release the electromagnetic hold open devices on corridor doors.
   4. Transmit signal to close smoke dampers.
   5. Transmit alarm signal to energy management system for shutdown of building air handler.
   6. Transmit alarm signal to the central station office.
7. Release exit door locks.

D. System shall not incorporate a time delay for any of the alarm initiating devices. All alarms shall be considered confirmed alarms.

E. Detection shall be addressable and reporting of fire conditions to be accomplished by the following basic methods:
   2. Smoke detectors.
   3. Heat detectors.
   4. Duct detectors.
   5. Waterflow switches.

F. Alarm system inputs to be further subdivided as follows, for a more defined indication of the location and nature of the fire or trouble condition:
   1. Manual station by device and location.
   2. Smoke/heat detector by device and location.
   3. Waterflow or pressure switch by device and location.
   4. Sprinkler valve position indication by device and location.

G. Alarm condition shall override trouble indication. Trouble indication shall reappear after alarm reset.

1.7 LOADS OF EQUIPMENT AND COMPONENTS

A. Follow IEEE Standard where applicable.

B. Provide fuse protection for equipment and spare fuses.

C. Design systems for operation at 120 volts, normal or emergency power as indicated, 60 Hz nominal input.

D. Operating voltage dissipated by resistors shall not exceed 25% of ratings.

E. Operating voltage of capacitors shall not exceed 80% of rated voltage.

F. Operating loads and voltages on transistors and solid-state devices shall not exceed manufacturer's recommendation for normal full load operation.

G. Use electronic components of types and rating commonly available from stock of established commercial distribution.

1.8 GUARANTEE

A. Conform to applicable provisions of the GENERAL REQUIREMENTS.
B. Service technicians and replacement components for the system shall be available locally from a service representative of the manufacturer who is able to provide evidence of technical training and authorization by the manufacturer.

C. For a period of two years from date of final acceptance, the system shall be under full guarantee for materials and labor at no cost to the District. The system shall be under a service contract with a technician authorized by the manufacturer. Replacement parts and labor shall be readily available during normal business hours while the service contract is in effect. A complete system inspection and test shall be performed at five months and again at eleven months after final acceptance. Tests shall include all smoke detector sensitivity settings.

D. All component failures shall be remedied to the satisfaction of the Owner.

E. A continuing service contract shall be offered at time of bid to commence at the expiration of warranty included with the system.

PART 2 - PRODUCT

2.1 MATERIALS

A. Alarm Panel and system shall be UL listed for power-limited application, (as described on the plans). System shall be as manufactured by Fire-Lite or approved alternate.

PART 3 - EXECUTION

3.1 GENERAL

A. Comply with all applicable paragraphs in Section 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL, apply as though repeated herein.

B. Install system(s) in accordance with manufacturer's instructions.

C. Include services of certified technicians to supervise installation, provide adjustments, provide final connections, system testing and system training to Owner Representative.

3.2 GROUNDING

A. All equipment to be grounded by means of green ground wire to "U" contact of duplex receptacles and bonded to ground provided under Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS.
3.3 INSPECTION

A. Systems to meet all the requirements of the CSFM and IOR and AHJ and shall be approved thereby before installation and prior to final acceptance.

3.4 LOCATION

A. Before installation, verify exact location of control equipment and outlets. The Owner reserves the right to relocate system components within a radius of 20’ at no increase in cost before rough-in work is started for the respective component.

3.5 WIRING

A. Furnish all conductors, equipment, terminal strips, etc., and labor to install a complete and operable system. All cable conductors shall be color coded and numbered for identification at all terminals. Green shall be for grounding conductor only. Use red insulation and or red jacketing on all fire alarm cable.

3.6 TESTING

A. After all equipment specified herein for each system has been installed and is in operating condition, conduct performance tests to determine if the installation and components comply with these specifications. Furnish competent personnel, all test material and approved test instruments and conduct the tests under supervision of factory personnel, in the presence of the Engineer, the building and fire inspecting agencies.

1. The contractor’s job foreman, in the presence of a representative of the manufacturer, a representative of the owner, and the fire department shall operate every installed device to verify proper operation and correct annunciation at the control panel.

2. At least on half of all tests shall be performed on battery standby power.

3. Where application of heat would destroy any detector, it may be manually activated.

4. The signaling line circuits and notification appliance circuits shall be opened in at least two (2) locations to verify the presence of supervision.

5. When the testing has been completed to the satisfaction of the Owner’s representative a letter attesting to the satisfactory completion of said testing shall be forwarded to the owner and the authority having jurisdiction.

6. The contractor shall leave the alarm system in proper working order, and, without additional expense to the Owner, shall replace any defective materials or equipment provided by him under this contract within two years from the date of final acceptance by the awarding authority.

7. The local responding fire department must be notified prior to the final test in accordance with local requirements and when requested, participate in system testing and evaluation.
3.7 REPORT

A. Prepare written report of final test results, signed by witnessing parties. Submit to the Engineer in triplicate for final approval.

END OF SECTION 28 31 00
SECTION 32 17 00
PARKING BUMPERS

PART 1 - GENERAL

1.1 SUMMARY
   A. Section Includes: Provide precast concrete parking bumpers (wheel stops) with adhesives for complete secure installation.

1.2 SUBMITTALS
   A. Product Data/Shop Drawings: Submit for parking bumpers dimensions, anchorage, and locations in typical parking spaces.

1.3 QUALITY ASSURANCE
   A. Sustainability Requirements: Comply with CALGreen requirements including those relative to finish material pollution control for adhesives, sealants, and caulks.

PART 2 - PRODUCTS

2.1 MATERIALS
   A. System Description: Provide precast concrete parking bumpers (wheel stops).
   B. Accessibility Regulatory Requirements: Provide for assuring access for persons with disabilities in accordance with state and federal regulations.
      2. Federal Regulations: Comply with Americans with Disabilities Act (ADA) Standards.
   D. Parking Bumpers: Stock manufactured parking bumpers of not less than 3000 psi concrete, without holes.
   E. Epoxy Adhesive: Nontoxic epoxy adhesive as recommended by adhesive manufacturer for use with parking bumpers and capable of withstanding loads from automobile wheels; steel anchor devices are not acceptable.
PART 3 - EXECUTION

3.1 INSTALLATION

A. Set parking bumpers in minimum two spots of epoxy adhesive at locations indicated and as required by applicable codes and regulations.

1. Provide at front of each parking space unless otherwise indicated on Drawings.

B. Set square and true with parking space lines.

END OF SECTION
PART 1 – GENERAL

1.1 DESCRIPTION:

A. Work Included:

Order and furnish all labor, materials, supplies, tools, and transportation and perform all operations in connection with and reasonably incidental to the complete installation of the water connection and automatic irrigation system as shown on the Drawings. Items listed hereinafter are included as an aid to estimating quantities and are not necessarily a complete list of work items.

1. Trenching, stockpiling excavation materials and refilling trenches.
2. Furnishing materials and installation for complete system including point of connection, electrical connection for controller, automatic controller, piping, valves, fittings, bubblers, emitters, and final adjustment of sub-bubblers and emitters to ensure complete turf coverage and water to plants and trees.
3. 120-volt line voltage connections to the irrigation controller.
4. Low voltage control wiring from irrigation controller to remote control valves.
5. Replacement of unsatisfactory materials.
6. Clean-up, inspection, and approval.
7. All work of every description mentioned in the Specification and/or addenda thereto, and all other labor and materials reasonably incidental to the satisfactory completion of the work, including clean-up of the site, as directed by the Engineer.
8. Tests.
9. Record Drawings.

B. Related Work Described Elsewhere:

1. Section 32 90 00: Landscape Planting

1.2 GENERAL REQUIREMENTS:

A. Purpose: It is the intention of these Specifications to accomplish the work of installing an irrigation system which shall operate in an efficient manner, provide 100% uniform coverage, and be water conserving. The Drawings indicate the general arrangement of piping and equipment, and do not necessarily indicate all offsets, fittings and accessories that may be required. Furnish incidental materials and labor not specifically called for but required to complete work as intended.

B. OSHA Compliance: All articles and services covered by this Specification shall meet or exceed the safety standards established under the Federal Occupational
Safety and Health Act of 1970, together with all amendments in effect as of the date of this Specification.

C. Codes and Standards: Comply with all applicable codes and standards.

1. Perform work in accordance with the Napa County Standard Plans and Specifications unless otherwise noted. Should there be discrepancies between the standard plans and specifications and the project drawings and specifications, the most stringent shall prevail as determined by the Engineer.

2. Work and materials shall be in full accordance with the latest rules and regulations of the California Electric Code, the Uniform Plumbing Code, published by the Western Plumbing Officials Association and other applicable State or local laws or regulations. Nothing in these Drawings or Specifications shall be construed to permit work not conforming to these codes.

3. When the Specifications call for materials or construction of a better quality or larger size than required by the above-mentioned rules and regulations, the provision of the Specifications shall take precedence over the requirements of the said rules and regulations.

4. Furnish, without any additional cost to Napa County, any additional material and labor required to comply with these rules and regulations. Provide the work even if it is not mentioned in this section or shown on the Drawings.

5. Erect and maintain barricades, guards, warning signs and lights as required by the Engineer or required by OSHA regulations for the protection of the public or work crew.

6. Damage by Leaks: The Contractor shall be responsible for damages to any property or work caused by leaks in the piping systems being installed. Repair, at no additional expense to Napa County, all damages so caused. All repair work shall be done as directed, and in a manner satisfactory to the Engineer.

7. Protection: The Contractor shall be responsible for any damage to this work, which occurs before final acceptance. Securely cover all openings into the systems and protect all apparatus, equipment, and appliances, both before and after being set in place, to prevent obstructions in the pipes and breakage, misuse or disfigurement of the apparatus, equipment of appliance.

1.3 QUALITY ASSURANCE:

A. Provide evidence to the Engineer that skilled and an experienced supervisor and work crew will be employed on the job from beginning to end.

B. Provide evidence to the Engineer that the Contractor is skilled and experienced in the construction of an irrigation system. Contractor shall provide with the bid documents a list of at least five irrigation projects constructed in the last five years by the Contractor that have used the listed equipment.

1.4 LAYOUT OF WORK:
1.5 INSTRUCTION:

A. Stake out the irrigation system as shown on the Drawings. Obtain approval from the Engineer before starting work.

1.6 SUBMITTALS:

A. Equipment List and Drawings:

Within 14 days after date of Notice to Proceed, submit to the Engineer for approval, a list of the proposed equipment and material to be furnished and installed. The list shall be complete as to name of manufacturer, size, and catalog number of units, and be supplemented by such other data as may be required, including detailed scale Drawings, plumbing and wiring diagrams.

Submit materials list using the following format:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Manufacturer</th>
<th>Model No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pressure Supply Line</td>
<td>Lasco</td>
<td>Sch. 40</td>
</tr>
<tr>
<td>2</td>
<td>Lawn Head</td>
<td>Rainbird</td>
<td>2400</td>
</tr>
<tr>
<td>3</td>
<td>etc.</td>
<td>etc.</td>
<td>etc.</td>
</tr>
</tbody>
</table>

B. Record Drawings:

1. Record accurately on one set of black line prints, changes in the work constituting departures from the original contract Drawings, including changes in pressure and non-pressure line locations, and a complete schematic circuit diagram.

2. Record the changes and dimensions in a legible manner and to the satisfaction of the Engineer. Prior to final inspection of work, and prior to transferring the information to mylars, submit record prints to the Engineer for approval.

3. Dimension from two permanent points of reference (buildings, monuments, sidewalks, curbs, pavements, etc.). Record data to be shown on record prints, day-to-day, as the project is being installed.

4. Show locations and depths of the following items:
   a. Point of connection.
   b. Controller.
   c. Routing of irrigation main line pipe. Provide dimensions a minimum of 100 feet along main line route.
   d. Gate valves.
   e. Remote control valves or valve groups.
   f. Quick coupling valves.
   g. Routing of control wires.
   h. Routing of conduit.
   i. Sleeves.
   j. Related equipment (as may be directed by the Engineer).
5. Maintain record prints on-site at all times.
6. Upon completion of work, transfer all as-built information and dimensions to reproducible sepia mylars. Correct and record the changes and dimensions in a legible manner and to the satisfaction of the Engineer.

PART 2 – PRODUCTS

2.1 PIPE:

A. Pipe manufacturer: PW Pipe, JM Pipe or approved equal.

B. Pipe Material: Polyvinylchloride (PVC) plastic in conformance with ASTM D1784 (cell class 12454-B).

C. Schedule or Class:

1. Main line pipe:
   a. 3 inch diameter pipe: Class 200 PVC plastic pipe with solvent cemented joints
   b. 2-1/2 inch and smaller: Schedule 40 PVC plastic pipe with solvent cemented joints.

2. Lateral line pipe (non-pressure):
   a. Schedule 40 PVC plastic pipe with Schedule 40 Type I, Grade I, PVC with solvent weld fittings.

D. Identification marking:

1. Pipe shall be clearly marked at regular intervals indicating the manufacturer’s name, nominal pipe size, schedule or class, pressure rating in PSI, and date of extrusion.

E. Sleeves:

1. Sleeves: 1120-Schedule 40 PVC pipe, minimum of two times the diameter of pipe contained within.

F. Connections between main lines and remote control valves: Schedule 80 PVC (threaded both ends) nipples and Schedule 40 PVC fittings.

2.2 PIPE FITTINGS:

A. Fitting manufacturer: Dura, Spears, Lasco, or approved equal.

B. Schedule or Class:

1. 3 inch and smaller main line pipe and all lateral pipe: Schedule 40 PVC plastic with solvent cemented or threaded joints as shown on the Drawings.
2.3 GATE OR BALL VALVES:
   A. Provide the valves as listed on the Drawings.
   B. Gate valves shall have a resilient wedge.
   C. Ball valves shall be the full port style.

2.4 QUICK COUPLING VALVES:
   A. Provide the two-piece, locking, and rubber covered quick coupler valves as listed on the Drawings.

2.5 REMOTE CONTROL VALVES:
   A. Provide the remote control valves as listed on the Drawings.

2.6 BOXES FOR QUICK COUPLING VALVES:
   A. Carson round plastic valve box with plastic lid. Lid shall be marked: “Irrigation”. See Drawings for size.

2.7 BOXES FOR REMOTE CONTROL VALVES, OR GATE VALVE:
   B. Remote control valves: Carson valve box with bolt-down plastic lid or approved equal. Lid shall be marked: “Irrigation Valve”.
   C. Gate valve: Carson round plastic valve box with plastic lid. Lid shall be marked: “Irrigation”.
   D. Use plastic box extensions made by the same manufacturer and of equal size to the valve box as required to allow access to the valve.
   E. See Drawings for sizes.

2.8 CONTROLLER:
   A. Provide the specified controller as listed on the Drawings.

2.9 LOW VOLTAGE WIRE:
   A. Wire type: single conductor, copper with insulating jacket, UL approval for direct burial in ground, AWG-UF.
   B. Common ground wire: minimum size #12-1, white jacket with colored stripe to match jacket color of controller’s control wire. Caution: provide a separate common ground wire for each controller.
   C. Spare wire: minimum size #14-1, yellow jacket with colored stripe to match jacket color of control wire.
D. Control wire: minimum size #14-1, unique color jacket for each controller, such as:
   1. Controller “A” = Red

E. Weatherproof splices: 3M model 3M-DBY, King model Dryconn #10999, Spears model #400 pre-filled seal packs or approved equal.

2.10 BUBBLERS AND EMITTERS:

A. Provide and install bubblers and emitters as listed on the Drawings.

2.11 PULL BOXES:

A. Install pull boxes at the locations shown on the plans or at locations designated by the Engineer at site of work. Contractor may, at no additional expense to Napa County, install such additional pull boxes as may be desired to facilitate work.

B. Carson Model 1419, 12 inch x 17 inch x 12 inch deep valve box with bolt-down plastic lid or approved equal. Lid shall be marked: “Irrigation”.

2.12 PVC-CONDUIT:

A. Polyvinylchloride conduit: heavy-wall, Schedule 40, with factory made solvent cemented socket sweep elbows, couplings, and fittings, as permitted by NEC.

2.13 MISCELLANEOUS INSTALLATION MATERIALS:

A. Solvent cement and primer for solvent weld joints: make and type approved by manufacturer(s) of pipe and fittings. Maintain cement at proper consistency throughout use.

B. Pipe joint compound: non-hardening, non-toxic materials designed specifically for use on threaded connections in water carrying pipe. Rectorseal T+2 pipe thread sealant or equal.

2.14 MISCELLANEOUS EQUIPMENT:

A. Provide all equipment called for by the Drawings.

PART 3 – INSTALLATION

3.1 PREPARATION:

A. General: Prior to all work of this section, carefully inspect the installed work of all other trades, and verify that their work is complete or to the point where this installation may properly commence. Verify that irrigation system can be installed in strict accordance with pertinent codes and regulations, the original design, the referenced standards, and the manufacturer’s recommendations.
In the event any equipment or methods indicated on the Drawings or in Specifications is in conflict with local codes, immediately notify the inspector prior to installing. If this notification is not provided, assume full responsibility for the cost of any and all revisions necessary to comply with code.

Grades: Before starting work, carefully check grades to determine that work may safely proceed, keeping within the specified material depths with respect to finish grade.

Coordination with work of other trades: Provide all necessary measurements in the field to ensure precise fit of items in accordance with the original design. Coordinate the installation of irrigation materials with all other work. Give special attention to coordination of piping locations with new and existing signage, light standards, hydrants, and other utility locations to avoid conflicts.

B. Point of Connection: Connect the water supply to locations as shown on the Drawings. Make minor changes caused by actual site conditions at no additional cost to Napa County.

C. Electrical Connection: Make 120 volt-single phase connection to the irrigation controller, for a complete and operational system.

3.2 HANDLING AND STORAGE:
A. Protect work and materials from damage during construction and storage as directed by the Engineer.

B. Handle plastic pipe carefully; especially protect it from prolonged exposure to sunlight.

3.3 LAYOUT:
A. Lay out work in accordance with diagrammatic construction Drawings.

B. Where site conditions do not permit location of piping, valves and heads where shown, notify the Engineer immediately and determine relocation in joint conference.

C. Run pipelines and automatic control wiring in common trenches wherever practical. When pipe and wire area placed in the same trench, it is required that a minimum separation of 3 inches shall be maintained between pipes and/or pipes and wiring.

3.4 EXCAVATING AND TRENCHING:
A. Excavate trenches ample in size to permit the pipes to be laid at the elevations intended and to permit ample space for joining. When two pipes are to be placed in the same trench, maintain a minimum of 3 inches between pipes.

B. Make trenches for pipelines deep enough to provide minimum cover from finish grade as follows:
1. Main line pipe:
   a. 24 inch minimum cover in sleeve under pavement.
   b. 3 inch diameter: 24 inch minimum cover over main lines to control valves and quick coupling valves.
   c. 2-1/2 inch diameter and smaller: 18 inch minimum cover over main lines to control valves and quick coupling valves.
   d. Low voltage wire: 24 inch minimum cover in sleeve under pavement; 18 inch minimum cover over control wires from controller to remote control valves.
   e. Lateral line pipe: 24 inch minimum cover in sleeve under pavement; 12 inch minimum cover over remote control valves to bubblers and emitters.

C. Restore surfaces, existing underground installations, utilities, plant materials, etc., damaged or cut as a result of excavations, to original conditions in manner approved by the Engineer.

D. Where other utilities interfere with irrigation trenching and pipe work, adjust the trench depth as instructed by the Engineer.

3.5 ASSEMBLING PIPELINES:

A. Assemble pipe free from dirt and pipe scale. Ream field cut ends to full pipe diameter with rough edges and burrs removed.

B. Solvent-Weld Main Line:

1. At changes in direction or branch mains, use appropriate Schedule 40 PVC fittings as approved by the Uniform Plumbing Code.

C. Solvent Weld Joint:

1. Prepare joint by first making sure the pipe end is square, then deburring the pipe end and cleaning pipe and fittings of dirt, dust, and moisture.
2. Dry-insert pipe into fitting. Pipe should enter fitting 1/3 to 2/3 depth of socket.
3. Coat the inside of socket surface of the fitting and the external surface of the male end of the pipe with solvent cement primer (P-70 as manufactured by Weld-On or approved equal). Then without delay, apply solvent cement (Weld-On 711 as manufactured by Weld-On or approved equal unless otherwise noted) liberally to the male end of the pipe and also apply solvent cement lightly to the inside of the socket. At this time, apply a second coat of solvent cement to the pipe end. (Solvent cement with primer incorporated into the solvent cement may be used.)
4. Insert pipe immediately into fitting and turn 1/4 turn to distribute cement and remove air bubbles. The pipe must seat to the bottom of the socket and fitting. Check alignment of the fitting. Align the pipe and fitting properly to prove no strain to either.
5. Hold joint still for approximately thirty (30) seconds and then wipe excess cement from the pipe and fitting.
6. Cure joints a minimum of thirty (30) minutes before handling and at least six (6) hours before allowing water in the pipe.

D. Threaded Joint:

1. Field threading of plastic pipe or fittings is not permitted. Provide factory-formed threads only.
2. Field-cut threads in metallic pipe will be permitted only where absolutely necessary. When field threading, cut threads accurately an axis with sharp dies.
3. Provide threaded joints with pipe joint compound. Apply compound to male threads and first two female threads only.
4. Where assembling metallic pipe to metallic fitting or valve, no more than one full turn beyond hand tight.
5. Where assembling to threaded plastic fitting, take up joint no more than one full turn beyond hand tight.
6. Where assembling soft metal (brass or copper) or plastic pipe, use strap type friction wrench only; do not use metal-jawed wrench.

E. Cap or unplug openings as pipeline is assembled to prevent entrance of dirt or obstruction. Remove caps or plugs only when necessary to continue assembly.

F. Where pipes or control wires pass through sleeves, provide removable non-decaying plug at ends of sleeve to prevent entrance of earth.

3.6 SLEEVES AND ELECTRICAL CONDUIT:

A. Install sleeves to carry main line pipe, lateral line pipe, and wire under concrete and asphalt surfaces. Provide a sleeve even if the Drawings do not indicate a sleeve under the concrete and asphalt surfaces.

B. Install PVC electrical conduit to carry control wires under concrete and asphalt surfaces where a sleeve does not exist for main and/or lateral line pipe.

C. Sleeves and/or conduit under existing paving: Bore for sleeves and/or conduit under existing paving and extend 12 inches beyond paving edge. Provide a separate sleeve for each water line and conduit for electrical control wires.

3.7 REMOTE CONTROL VALVES:

A. Install where shown and on Drawings and group together where practical. Provide only remote control valve per box without exceptions.

B. Locate valve boxes 12 inches from and perpendicular to hardscape edges and walls.

C. Provide 12 inches between valve boxes where valves are grouped together.

D. Thoroughly flush main line before installing valve.

E. Install in shrub or hydroseed areas rather than turf areas where possible.
F. Adjust remote control valve flow stems and/or pressure regulator as follows:
   1. The most remote bubblers and emitters operate at the pressure recommended by the manufacturer.
   2. Uniform distribution of water is applied by the bubblers and emitters to the plants.

G. Label control line wire at each valve with a 2-1/4 inch x 2-3/4 inch polyurethane I.D. tag, indicating identification number of valve (controller and station number). Attach label to control wire.

3.8 VALVE BOXES:

A. Provide and install remote control valves, ball valves, gate valves, or other valves in a valve box as shown in details, complete with cover bolted to valve box.

B. Set valve boxes to finish grade in turf or hydroseed areas and 2 inches above finish grade in groundcover areas.

C. Install one remote control valve in one valve box - no exceptions.

D. Do not allow valve boxes to rest on pipes.

E. Provide a minimum of 2 inches clear distance between valve and the box wall.

F. Install valve boxes located near walks, curbs, edging and paving in such a way as to allow for valve boxes to abut those items with top lid surface matching plane of items listed above.

3.9 AUTOMATIC CONTROL WIRING:

A. Run wires along mains wherever practical. Tie wires in bundles with pipe wrapping tape at 10 foot intervals and allow slack for contraction between strappings. Do not tape wire together where contained within sleeving of conduit.

B. Loop a minimum of three (3) feet of extra wire in each valve box; control wire, spare wire, and common ground wire.

C. Provide an expansion curl within three (3) feet of each wire connection and at least every 100 feet of wire length on runs more than 100 feet in length. Form expansion curls by wrapping at least 5 turns of wire around a 1 inch diameter pipe, then withdraw the pipe.

D. Make connections by crimping bare wires with brass connectors and sealing with splice kits as detailed.

E. Field splicing will be permitted only upon written approval from the Engineer. Locate splices at valve locations within valve boxes.

F. Where control lines pass under paving, install wire in Schedule 40 electrical PVC conduit or inside a sleeve for irrigation pipes.
3.10 CONTROLLER:

A. Provide and install irrigation controller in location shown on Drawings. The exact location will be determined on the site by the Engineer. Provide conduit and wire and connect to 120-volt power.

B. Connect control lines to controller in sequential arrangement according to assigned identification number of valve. Label each control line wire at controller with a permanent, non-fading label indicating station number of valve controlled. Attach label to control wire.

3.11 BACKFILLING:

A. Backfill only after piping has been tested, inspected and approved by the Engineer.

B. Refer to the Drawings for sand bedding, bedding and clean backfill requirements.

C. Backfill material: earth excavated from the trenches, free from rocks, concrete chunks and other foreign or coarse materials.

D. Place backfill materials in 4 inch layers and compact to between 85 and 90% relative compaction.

E. Dress areas to finish grades and remove excess oil, rocks or debris remaining after backfill is completed.

F. If settlement occurs along trenches, and adjustments in pipes, valves and lateral lines, soil, sod, or paving are necessary to bring the system, soil, sod or paving to the proper level or the permanent grade, as part of the work under this Contract, make all adjustments without additional cost to Napa County.

3.12 BUBBLERS, EMITTERS AND QUICK COUPLER VALVES:

A. Thoroughly flush lines before installing bubblers, emitters or QCV’s.

B. Locate bubblers, emitters and QCV’s as shown in the Drawings and detail.

3.13 TESTS:

Perform tests as specified below. Remake any faulty joints with new materials. Use of cement or caulking to seal leaks is absolutely prohibited.

A. Record Prints: No testing or system observation shall commence without “record” prints. In the event the Contractor calls for testing or system observation without up to date “record” prints, without completing previously noted corrections, or without preparing the system for testing or system observation, the testing or system observation will be canceled, and the Contractor will be charged for the direct costs of all Napa County personnel’s time and consultant’s time lost. Testing or system observation will be required for:
1. Pressure test of irrigation main line.
2. Coverage test.
3. Start of maintenance period.
4. Final acceptance.

B. Notify the Engineer at least three (3) days in advance of testing.

C. Perform testing at no additional expense to Napa County and in the presence of the Engineer.

D. Center load piping with small amount of backfill to prevent arching or slipping under pressure. No fitting shall be covered.

E. Apply the following tests after weld plastic pipe joints have cured at least 24 hours.
   1. Prior to the installation of any valves to the main line, flush pipes with water and fully expel air from piping. Cap ends of pipe and test pressure lines with the line fully charged with water.
   2. Test live (constant pressure), QCV lines, and RCV controlled laterals within the synthetic turf field hydrostatically at 125-psi minimum. Lines will be approved if test pressure is maintained for six (6) hours. Contractor shall make tests and repairs as necessary until test conditions are met.
   3. Test RCV controlled (lateral) lines prior to installation of bubblers or emitters with water at line pressure and risers capped, and visually inspect for leaks. Retest after correcting defects.

F. Coverage Test: When the irrigation system is completed, perform a coverage test in the presence of the Engineer to determine if the water coverage for planting areas is complete and adequate. Provide this test prior to planting. Overspray that causes runoff to non-landscaped areas such as storm drain system, streets, or waterway shall not be permitted. Overspray on drinking fountains, picnic areas, and non-turf play areas shall not be permitted.

G. Testing of Electrical System:

Prior to acceptance of the work, provide the following tests to wiring:
   1. Continuity test of each circuit.
   2. Ground fault of each circuit.
   3. A functional test to demonstrate that each and every part of the system functions as specified or intended herein.
3.14 GUARANTEE:

A. Unconditionally guarantee the entire irrigation system for material and installation, including settling of backfilled areas below grade for a minimum period of one year following the date of final acceptance of the work.

B. Submit a guarantee on Contractor letterhead as follows:
We hereby guarantee that the irrigation system we have furnished and installed is free from defects in materials and workmanship, and the work has been completed in accordance with the Drawings and specifications, ordinary wear and tear and unusual abuse, or neglect excepted, and that the work, materials and equipment as installed will fulfill the requirements of the guarantee included in the specifications. We agree to repair or replace any or all of our work, together with any other adjacent work which may be displaced by doing so, that may prove to be defective in materials and installation within a period of one (1) year from date of acceptance of the below named project in Napa County, at no additional cost to Napa County. We shall make such repairs or replacement of the work within seven (7) calendar days of written notification by the Engineer. When the immediate repair or replacement of the work is necessary to ensure the public safety and welfare, which would be endangered by continued usage of the facility, such circumstance will be deemed an operational emergency. In the event of such an emergency after the Engineer contacts our firm and after authorizing 24 hours to initiate repairs, if we fail to initiate and diligently complete such repairs in a timely manner, the Engineer may direct Napa County forces to perform such functions as may be necessary to correct the work and immediately place the facility back in operations condition. If such procedure is implemented, we shall bear all expenses incurred by Napa County. In all cases, the judgment of the Engineer shall be final in determining whether an operational emergency exists. In the event of our failure to make such repairs or replacements within the times specified after receipt of written notice from the Engineer (other than an operational emergency), we authorize Napa County to proceed to have said repairs or replacements made at our expense and we will pay the costs and charges therefore upon demand.

PROJECT: _________________________________________________
LOCATION: _______________________________________________
SIGNED: _________________________________________________
ADDRESS: _______________________________________________
PHONE: _________________________________________________
C. If, within one year following acceptance of the work, settlement occurs and adjustments in pipes, valves and laterals, soil or paving is necessary to bring the system, soil or paving to the proper level of the permanent grades, as part of the work under this Contract, make all adjustments without extra cost to Napa County, including the complete restoration of all damaged planting, paving or other improvements of any kind.

D. Should any operational difficulties in connection with the irrigation system develop within the specified guarantee period which in the opinion of the Engineer may be due to inferior material and/or workmanship, correct said difficulties immediately and to the satisfaction of the Engineer and at no additional cost to Napa County, including any and all other damage caused by such defects.

3.15 CLEAN UP:

A. Upon completion of the work, and at the end of each day, smooth all ground surfaces; remove excess materials, rubbish, debris, etc., sweep adjacent streets, curbs, gutters and trails and remove construction equipment from the premises.

3.16 MAINTENANCE:

A. Properly and completely maintain the irrigation system. Maintain a balanced water program to ensure proper germination and growth until acceptance of the work. Plants which cannot be watered sufficiently with the irrigation system shall be watered by means of a hose.

B. Controller shall have each station individually adjusted on a weekly basis. Program controller considering the application rate each area is capable of receiving. Operate the system on short intervals, with the cycle repeating at a later time to reduce runoff. Program the irrigation system to operate between dusk and dawn (nightly) only and during non-windy hours.

3.17 TURNOVER ITEMS:

A. Controller Charts:

1. The Engineer must approve record prints before charts are prepared.
2. Provide one controller chart (of the maximum size controller door will allow) for each automatic controller. Chart shall show the area covered by controller.
3. The chart shall be a reduced copy of the actual “record” print. In the event the controller sequence is not legible when the print is reduced, enlarged to a readable size.
4. Color code the chart with a different color to show the area of coverage for each station.
5. When completed and approved, hermetically seal the chart between two pieces of plastic, each piece being minimum 20 mils in thickness. Install the chart in the controller enclosure using weatherproof Velcro fasteners.
6. Controller charts are to be completed prior to final observation.
B. Operation and Maintenance Manuals:

Within 10 calendar days prior to acceptance of construction, prepare and deliver to the Engineer all required descriptive materials, properly prepared in two individually bound copies of the operation and maintenance manual. The manual shall describe the material installed and be in sufficient detail to permit operating personnel to understand, operate and maintain all equipment. Include spare parts lists and related manufacturer’s information for each equipment item installed. Each complete, bound manual shall include the following information:

1. Index sheet stating Contractor’s address and telephone, including names and addresses of local manufacturer’s representative.
2. Complete operating and maintenance instructions on all major equipment.

C. Materials to be furnished:

1. Supply as part of the contract the following spare parts:
   a. 4 percent additional bubblers and emitters of each type shown.
   b. Two (2) keys for each automatic controller.
   c. Two (2) couplers with a ¾ inch bronze hose bib, bent nose type with hand wheel and two coupler keys.
   d. “As-built” mylars from “record” prints.
   e. Gate valve key.

2. Turnover the above spare parts to the Engineer at the final observation.

END OF SECTION
PART 1 – GENERAL

1.1 SUMMARY:

A. Work Included:
   1. Furnish all plant materials, unless otherwise noted.
   2. Furnish all labor, equipment and materials necessary for landscape planting installation and maintenance according to these Specifications, unless otherwise noted.

B. Related Work:
   1. Section 32 84 00: Irrigation System
      Irrigation system shall be installed and operative before beginning planting operation. Contractor shall fully acquaint himself with the existing conditions, particularly in reference to underground piping. Any damage caused by the Contractor to work of other trades shall be repaired by Contractor at no cost to Napa County.

1.2 COORDINATION:

A. Coordinate work fully with all other trades involved. Coordinate with items of other trades to be furnished and set in place. Such portions of their work as is all or in part embedded, built-in, attached to, or supported by the work shall be executed by them in ample time that progress of the work is not delayed. Contractor shall be responsible for the proper installation of all items related to this section.

B. Contractor shall coordinate with the Engineer and fully acquaint himself with the existing conditions particularly in reference to any existing underground piping. Any damage caused by the Contractor to work of other trades shall be repaired by him at no cost to Napa County.

1.3 REFERENCE:

A. Perform work in accordance with all applicable laws, codes and regulations, as required by the Engineer.

B. Reference to “Standard Specifications” shall mean the current Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, CALTRANS.
1.4 QUALITY ASSURANCE:

A. Personnel:
All planting shall be performed by personnel familiar with planting procedures under the supervision of a qualified foreman.

B. Codes and Standards:
Nursery stock shall meet the standards of the current edition of the “Agricultural Code of California” and the “Regulations of the Director of Agriculture Pertaining to Nursery Stock” as to grading and quality. They shall be true to type and name in accordance with “Standardized Plant Names, Second Edition.”

C. Substitutions:
No substitutions shall be permitted without approval of the Engineer. Napa County reserves the right to require the Contractor to replace at the Contractor’s cost any plants which the Contractor has installed without the Engineer’s approval.

D. Plants shall be subject to inspection and approval of the Engineer at place of growth or upon delivery for conformity to specifications. Such approval shall not impair the right of inspection and rejection during progress of the work.

1.5 SUBMITTALS:

A. Plant Certification:
All plants must meet specifications of Federal, State and County laws requiring inspection for plant disease and insect infestations. Inspection certifications required by law shall accompany each shipment, invoice and order for stock.

B. Plant Material:
Contractor shall submit nursery sources for all plant material, clearly stating Botanical Name and container size. Additionally, Contractor shall submit photos from the sources and size specification including container size, height, diameter, and trunk caliper.

C. Topsoil, Amendment and Fertilizer:
Provide current, accurate analysis from an approved testing laboratory.

D. Mycorrhiza planting backfill.

E. Test Results for planting from a minimum of two locations shall include Combination Fertility, Agricultural Suitability, and Particle-Size Test by a soils laboratory approved by the Engineer.

F. Tree Stakes and ties as indicated on the Drawings.

G. Root Barriers as indicated on the Drawings.

H. Mulch as indicated on the Drawings.
1.6 JOB CONDITIONS:

A. Delivery:
   1. Deliver fertilizer and amendments to site in original, unopened containers bearing manufacturer’s guaranteed chemical analysis, name, trade mark and conformance to state law.
   2. Deliver plants with identification labels.
      a. Labels shall state correct name and size.
      b. Use durable, water-proof labels with water resistant ink that will remain legible for at least 60 days.
   3. Protect plant materials during transport to prevent damage to rootball or desiccation of leaves.
   4. Remove unacceptable plant materials immediately from job site.

B. Storage:
   1. Contractor shall maintain the plant material properly between delivery and planting. This includes protection from animals and vandals; proper watering and feeding when necessary.
   2. Shade plants shall be stored in the shade, and sun plants shall be stored in the sun.

C. Timing:
   Under no circumstances shall any work be performed when the temperature exceeds 90 degrees or is below 40 degrees. No planting shall be done with the soil saturated with water.

PART 2 – PRODUCTS

2.1 SOIL AMENDMENTS:

A. The following organic amendments, soil amendments and fertilizer rates and quantities are to be used for bid basis only. Contractor shall arrange and pay for testing by an accredited soils laboratory of existing site soil after rough grading operations are complete and shall amend the soils according to said laboratory’s recommendations. The soils recommendations shall be considered a part of this specification.

B. Topsoil: Provide topsoil as required to complete landscape work.
   1. Topsoil may include clean on-site material that has been previously stripped from the top 6 inches of original grade or acceptable import material (as applicable). Acceptable topsoil shall be free from “rocks” (rock, stones, rubble, clay clods, etc. over 1” in diameter), roots, toxins, and any other deleterious material per the discretion of the Engineer. All import topsoil proposed for use shall be submitted to the Engineer for review and acceptance prior to use. Submit samples and current soil fertility and structure analyses for approval by the Engineer.
   2. Topsoil to be furnished shall be fertile and friable, possessing characteristics of representative productive soils on the site. It shall not contain toxic substances which may be harmful to plant growth. When herbicide contamination is suspected then a radish/rye grass growth trial
must be performed. Consult with the Engineer prior to decision to test. It shall be uniformly textured and free of all objectionable foreign materials, oil or chemicals which may be injurious to plant growth. Natural topsoil shall possess a pH factor between 5.5 and 7.5, a sodium absorption ratio (SAR) of less than 8, a boron concentration of the saturation extract of less than 1 ppm, and salinity of the saturation extract at 25 degrees C. of less than 4.0 millimhos per centimeter. Obtain topsoil from naturally well-drained sites where topsoil occurs in a depth of not less than four inches (4”); do not obtain from bogs or marshes.

C. Organic Amendment:
1. Composted Organic Amendment will be provided by the Engineer and delivered to the site.
2. Physical Properties: A minimum of 90% of the material by weight shall pass a ½" screen. Material passing the ½" screen shall meet the following criteria:

<table>
<thead>
<tr>
<th>% Passing</th>
<th>Sieve Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>85-100</td>
<td>9.51 mm 3/8&quot;</td>
</tr>
<tr>
<td>50-80</td>
<td>2.38 mm No. 8</td>
</tr>
<tr>
<td>0-40</td>
<td>500 micron No. 35</td>
</tr>
</tbody>
</table>
3. Source material: Fully composted organic green waste
4. Carbon and Nitrogen ratio: Maximum 35:1 if material is claimed to be nitrogen stabilized.
6. Iron content: Minimum 0.08% dilute acid soluble iron based on dry weight; iron treated.
7. Salinity (ECe): 4.5 dS/m maximum @ 25 degrees C. as determined in a saturation extract.
8. Reaction (pH): Minimum: 5.5, Maximum: 8.0 as determined in saturated paste.
9. Moisture content 35% - 60%
10. Contaminants: the compost shall be free of contaminants such as glass, metal and plastic.
11. Maturity: Shall exhibit visible characteristics of maturity, including: dark brown to black color. Acceptable odor: moldy/musty, soil like, or none. Unacceptable odor: sour, ammonia or putrid.
12. Appearance: Identifiable wood pieces are acceptable, but the balance of the material should be soil like, without recognizable leaves.

D. Fertilizer:
1. Fertilizer shall be a commercial inorganic fertilizer in the granular or pelleted form. Fertilizer shall be delivered to the site in containers labeled in accordance with the applicable State of California regulations, bearing the warranty of the producer or the grade furnished, and shall be uniform in composition, dry and free-flowing.
2. Planting Areas:
   a. 6N-20P-20K, and 16-6-8, pelleted type.
   b. Sulphate – sulphur
   c. Lime for pH adjustment of moderately acid soil
d. Starting one (1) month after planting, on a monthly basis, 21N-0P-0K Ammonium sulfate. 5 lbs. per 1,000 square feet.

3. Trees:
   a. 21N-10P-5K slow release fertilizer tablets as manufactured by Agriform. Apply according to manufacturer’s instructions.
   b. After planting: 21N-0P-0K Ammonium sulfate 5 lbs. per 1,000 square feet.

E. Mycorrhiza planting backfill:

2.2 MULCH:

A. Mulch shall be a fibrous, woody bark mixture called “Walk-on Fir Bark” as distributed by Crown Hill Stone Supply, or an Engineer approved equal.

B. Particle sizes shall be as follows:
<table>
<thead>
<tr>
<th>Screen Size</th>
<th>% Weight Retained</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;</td>
<td>7</td>
</tr>
<tr>
<td>½&quot;</td>
<td>39</td>
</tr>
<tr>
<td>9.5mm (3/8&quot;)</td>
<td>24</td>
</tr>
<tr>
<td>6.4mm (1/4&quot;)</td>
<td>11</td>
</tr>
<tr>
<td>4.75mm</td>
<td>6</td>
</tr>
<tr>
<td>2.36mm</td>
<td>6</td>
</tr>
<tr>
<td>1.00mm</td>
<td>5</td>
</tr>
</tbody>
</table>

2.3 CONTAINER PLANTS:

A. All plant materials shall be nursery grown in accordance with the best known horticultural practices and under climatic conditions similar to those in the locality of the project.

B. Plants shall be vigorous and shall have a normal habit of growth. Plants shall be free of damage by insects, pests, diseases or wind; burns from insecticides or fertilizer; and stunted growth due to lack of water, lack of food, diseases or other causes. Plants shall be in conformity with the sizes shown on the Drawings.

C. Trees:
   Unless otherwise specified, tree trunks shall be straight with leader intact, undamaged and uncut. All old abrasions and cuts are acceptable only when completely callused over.

D. Quantities:
   Quantities necessary to complete the work as shown on the Drawings shall be furnished.

E. Root Systems:
All trees shall have a normal root system. No plants with roots that have encircled themselves will be accepted. In case of any unsatisfactory root system, a total group of plants may be rejected.

2.4 ROOT BARRIER:

A. Root barrier shall be installed between trees and pavement when trees are located within eight feet (8’) of pavement. Root barrier shall run parallel to pavement for a ten foot (10’) minimum distance.

B. Root barrier units shall be Deep Root Barrier UB 18-2 as manufactured by Deep Root Partners, (800) 458-7668, or approved equal.

PART 3 – EXECUTION

3.1 SURFACE CONDITIONS:

A. Inspections by the Landscape Contractor:

1. Prior to all work in this section, verify grades and carefully inspect the installed work of all other trades. Verify that all such work is complete to the point where the installation may properly commence.

2. All planting areas (except for Bioretention Area) shall contain a minimum of eight (8) inches of acceptable topsoil. As applicable and where needed, only previously acceptable topsoil shall be installed. See Drawings for Bioretention Area Loamy Sand.

3. Inspect plant materials for injury, insect infestations and proper pruning.

4. Landscape Contractor shall receive site graded to plus or minus one-tenth of a foot (0.10’) of finish grades shown on the Drawings. Allow for depth of soil amendments and mulch in determining the difference between finished subgrade in groundcover and shrub beds. Verify that subgrades are not compacted.

5. In the event of discrepancy, immediately notify the Engineer. Do not proceed with this installation in areas of discrepancies until all such discrepancies have been fully resolved.

3.2 SOIL PREPARATION:

A. In the areas designated for landscaping on the Drawings, Contractor shall, prior to placing imported material and replacing existing topsoil before doing any planting, verify that the areas are clear and free of weeds, roots, debris, rocks and underground obstructions, and construction debris to a depth acceptable for planting. Scarify the subgrade to a four inch (4”) minimum depth prior to spreading topsoil. Finished grades shall be approved by the Engineer prior to commencing soil preparation and planting operations.

B. Cultivation and Placement of Amendment:

1. In planting areas (excluding Bioretention Area), cultivate soil to a depth of six inches (6”). Incorporate six (6) cubic yards per 1,000 square feet of nitrified fir bark. Prior to planting, incorporate to a depth of six inches (6”) the following fertilizers, per 1,000 square feet: 30lbs. 6N-20P-20K.
C. Soil Mix for Backfill of Trees:
   1. The following ingredients shall be tumbled to achieve a homogenous mix:
      Organic Amendment  1 cubic yard
      Topsoil    3 cubic yards
      Fertilizer   10 pounds 6N-20P-20K
   1. Mix Mycorrhiza planting backfill with the planting backfill in the top 1” of
      the plant hole evenly distributed and as close to the rootball as possible at
      the following rates:
      4” pot or Liner: 1 teaspoon
      # 1 gallon: 1 tablespoon
      # 5 gallon: 4 tablespoons
      # 15 gallon: 6 tablespoons
      24” box 8 tablespoons

D. Finish Preparation:
   1. After approval of amendment and fertilizer applications by the Engineer,
      incorporate into the top six inches (6”) of soil by repeated rotary-hoe
cultivation.
   2. When rough grading and soil conditioning has been completed, all
      planting areas shall be smooth graded, ready for placement of plant
      materials and for seeding. Grading shall be done when soil is at optimum
      moisture content for working.
   3. Finished grades shown on the Drawings are given in feet and decimals of
      feet. Slope uniformly between given spot elevations. Planting areas shall
      be true to grade within one inch when tested in any direction with a 10
      foot straightedge.
   4. Grades not otherwise indicated shall be uniform levels or slopes between
      points where elevations are given or between points established by
      walks, paving, curbs or catch basins. Finished grades shall be smooth
      even and on a uniform plane with no abrupt change of surface. Minor
      adjustments of finish grades shall be made at the direction of the
      Engineer if required.
   5. All grades shall provide for natural runoff of water without low spots or
      pockets. Flow line grades shall be accurately set and shall not be less
      than 2 percent gradient wherever possible unless otherwise indicated on
      the Drawings.
   6. Tops and toes of all slopes shall be rounded to produce a gradual and
      natural-appearing transition between relatively level areas and slopes.
   7. Roll to compact amended soil to not more than 85% compaction.
   8. Finish out to a smooth, even surface conforming to established grades
      after settlement. Rake immediately prior to planting.
   9. If rain is likely between completion of soil preparation and planting,
      precaution shall be taken to prevent erosion of the soil.

3.3 CONTAINER PLANTS:

A. Preparation:
   1. Stake out location for plants and outline of planting beds on ground and
      obtain the approval of the Engineer before digging.
2. The Contractor shall protect all utilities, vegetation and structures during work.

B. Excavation:
   1. All plant pits shall be dug circular in outline and with vertical walls. The sides and bottoms of all planting pits shall be thoroughly scarified.
   2. Holes for fifteen (15) gallon size plants or larger: twenty-four inches (24") wider than the can or rootball, and twelve inches (12") deeper than the rootball.
   3. After pits are dug, break sides to open wall of pit for root penetration and loosen bottom of pit to a depth of three inches (3"). Construct a foot tamped mound in bottom of pit to support plant at proper level.

C. Plants in Containers:
   1. Plants shall be removed carefully from their containers after the containers have been cut on two (2) sides minimum; fifteen (15) gallon containers shall be opened in three (3) places.
   2. After removing plant material from its container, stimulate root growth by making four (4) or five (5) vertical cuts, one inch (1") deep around the circumference of the rootball.
   3. Do not lift or handle plants by the top, stems or trunk at any time. All plants shall be lifted in such a manner that the rootball is supported from the underside.
   4. The Contractor shall check all plants for adequate root systems. When the root system is defective, he shall remove deficient plants from the site and replace them with new ones with adequate root system.

D. Planting:
   1. Center plant in pit or trench over tamped mound.
   2. Face for best effect.
   3. Set plant plumb and hold rigidly in position.
   4. All plants shall be set in the ground so that the rootball will be flush with the finish grade. All plants that settle below the finish grade within thirty (30) days of acceptance of the work shall be replanted in the proper position. In case a total section of planting area settle, the Contractor shall lift the plants, import additional soil mix, regrade and replant, at no additional cost to Napa County.
   5. Use amended soil mix only for backfill. Backfill pit with soil mix in nine inch (9") layers and water each layer thoroughly to settle soil. The filled pit shall be flush with surrounding grade when complete.
      a. In the top 1" of the plant hole, mix Mycorrhiza planting backfill with the plant backfill. Evenly distribute the Mycorrhiza and place as close to rootball as possible at the following rates.
         4" pot or Liner: 1 teaspoon
         1 gallon: 1 tablespoon
         5 gallon: 4 tablespoons
         15 gallon: 6 tablespoons
         24" box: 8 tablespoons
   6. When the plant pit has been approximately one-half (1/2) filled, place planting tablets according to the manufacturer's schedule.
7. Planting areas shall be hand raked to remove all clods, weeds, roots, debris, and rocks 1-inch in diameter and larger.

3.4 TREE STAKING:

A. Stake trees as indicated on the Drawings.

B. Tying: find the proper support height by holding the trunk in one hand and pulling the top to one side and releasing it. The lowest height at which the trunk will return to the upright position when the top is released is the height at which to attach tree ties. Tree stakes shall be adjusted throughout the maintenance period as necessary to insure perpendicular growth habit due to severe windy conditions.

3.5 PRUNING:

A. Pruning shall be performed as required to maintain a natural appearance, promote healthy and vigorous growth and eliminate diseased or damaged growth.

B. Trees shall be pruned to thin crown and avoid wind damage, eliminate narrow V-shaped branch forks that lack strength, eliminate sucker growth and maintain a radial branching pattern to avoid crossing branches.

C. Under no circumstances will stripping of lower branches (“raising-up”) of young trees be permitted. Lower branches shall be retained in a “tipped back” or pinched condition with as much foliage as possible to promote caliper trunk growth (tapered trunk).

D. Major pruning of trees to compensate for root loss or for aesthetic reasons shall be done only with approval of the Engineer.

E. All pruning shall be made flush to lateral branches, buds or trunk. “Stubbing” will not be permitted.

F. Damage: All cuts over one inch (1”) resulting from pruning or wind breakage shall be inspected periodically for insect infestation or disease.

3.6 PROTECTION:

A. Protect all planted areas and plants against trespassing and damage at all times. If any plants are damaged, replace as directed by the Engineer with additional cost to Napa County.

3.7 CLEAN UP:

A. Upon completion of planting, all cans, boxes and other debris that is a part of the planting operation shall be removed from the site.
B. All pavements shall be washed off, and site shall be left in an absolutely clean condition. All planting areas shall be cultivated and weed free before final inspection. Clean-up operations shall take place throughout the course of work so that walks and drives are clean at all times.

3.8 INSPECTIONS:

A. Notification: The Contractor shall notify the Engineer a minimum of 72 hours before requiring a visit by the Engineer.

B. Check Points: The following shall be considered check points and the Contractor shall only proceed with the work after the Engineer has visited the site and determined that the work is proceeding satisfactorily.

1. Completion of rough grading in planting.
2. After placement of topsoil, soil amendment and fine grading before planting.
3. Layout of plant material. All plant material in the planting area shall be placed in the configuration shown on the Drawings prior to plant pit excavation.
4. Maintenance period shall not start until all construction for the entire project is complete.
5. A check visit shall be made to begin the maintenance period. At this time the Contractor shall have completed all phases of the Drawings and Specifications. Any discrepancies shall be noted at that time and the Contractor shall make appropriate corrections before beginning the maintenance period.

3.9 MAINTENANCE:

A. Contractor shall furnish all labor, material, equipment and services required to maintain the landscape in a healthy and attractive condition for a period of ninety (90) calendar days.

B. Maintenance shall include fertilization, watering, insect and disease control, weed control (hand or spray), mowing, pruning, restaking, continual checking, adjusting, programming and making all necessary repairs to the automatic irrigation system, cleaning of pavement, replenishment of bark mulch, and weekly trash removal from all project site areas. All chemical use shall conform to Napa County’s standards for application and notification.

C. No later than two (2) calendar weeks prior to the end of the maintenance period, the Contractor shall request in writing a review of the work by the Engineer. When, upon review, the Engineer finds all project work to be complete, the plant material to be in a healthy condition and all landscape areas to be weed-free and in a neat, orderly condition, then written acceptance of work shall be given by the Engineer. When approval and acceptance of the work is not given, the Engineer shall prepare a “construction punch list” of items to be completed before acceptance of the work is given. Acceptance shall only then be given upon verification by the Engineer that the punch list items have been completed. Maintenance period shall only commence after “construction punch list” items
have been completed and approved. “Construction punch list” items shall be completed within the specified construction period to avoid liquidated damages and extension of maintenance period.

1. All plant material shall be live, healthy, undamaged, vigorous and free from infestations.
2. Planting areas shall be free of all weeds.
3. Nursery stakes shall be removed from trees.

D. The Contractor’s maintenance period will be extended when the provisions required within the plans and specifications are not full complete and accepted by the Engineer.

E. Watering:
1. All plants shall be kept watered as often as it is necessary to keep them in optimum, vigorous growth. Watering shall be done preferably during the early morning hours.
2. Water shall be controlled so that there will be no excessive run-off, ponding or overwatering.
3. Root Growth: Periodically the Contractor shall check the progress of the root growth within the back fill area. As the root growth increases beyond the root ball, the frequency of watering shall be reduced to that the roots are encouraged to grow to a lower soil depth. Watering then shall be less frequent, but applications shall be very slow and the Contractor shall assure that water does penetrate to the depth of the former plant pit.

F. Spraying:
1. Trees shall be inspected at least two (2) times a month during the growing period to determine the need for spraying to control insect damage, fungus development or any other disease that might be attacking the plants. Plants shall be sprayed with a broad spectrum material that will control the specific pest and any other pests that might normally be anticipated during that part of the season. Preventative spraying shall be done only with the approval of the Engineer.
2. Operators of spray equipment shall take all reasonable precautions to protect themselves, other people and buildings from spray. The Contractor shall publicly notice the use of herbicides and have all permits and licenses required for such an operation. Where applicable, dormant spray shall be applied to shrubs and trees during the winter period.
3. All equipment shall be properly washed before and after use.
4. No spraying shall take place without proper public noticing procedures or during windy or gusty days.

G. Staking and Guying: Stakes and guys shall be inspected a minimum of two (2) times a month to assure that the wires and ties are tight and no damage has occurred to the tree trunk or branches. Contractor shall restake and guy trees as directed by the Engineer.

H. Weed Control:
1. Weeds shall be kept under control by hand removal. Herbicides shall only be used when approved by the Engineer. Weed all areas at an interval of not more than ten (10) days.

2. Pre-emergent herbicide shall be applied to all tree and shrub areas including plant basins. Chemicals used are to be in written chemical control program prepared by a licensed pest control advisor and approved by the Engineer. Apply prior to any mulching.

3. All equipment used for herbicides shall be properly cleaned before it is used on this project. Herbicides shall be applied at temperatures recommended by the manufacturers. Herbicides shall not be used during windy or gusty days. All possible precautions shall be taken to protect vegetation which is susceptible to damage from the particular herbicides to be used.

4. The bases of all plants shall be kept completely free of weeds. Periodically, the base of the trees and shrubs shall be cultivated in order to allow better penetration of water, but such cultivation shall be carefully done in order not to destroy surface roots.

I. Fertilization: Top dress all areas at one (1) month intervals from time of planting with fertilizer of same composition and at same rate as at time of planting.

J. Litter: The Contractor shall remove promptly after pruning, trimming and weeding or other work required under the contract, all debris generated by his performance of the work. Walkways, driveways and paved areas shall be vacuumed clean with suitable equipment immediately after working in these areas. All areas covered by this contract shall be kept free of debris and litter.

K. Pruning: Prune as necessary to remove injured twigs and branches, dead wood and suckers.

3.10 GUARANTEE AND REPLACEMENT:

A. Guarantee period shall be extended for a period of one (1) year from the date of written acceptance.

B. All plants shall be guaranteed to be alive and healthy as determined by the Engineer at the end of the guarantee period.

C. The Contractor shall replace within two (2) weeks of notice and in accordance with the Drawings and Specifications throughout the guarantee period, any plants that die, or in opinion of the Engineer, are in an unhealthy or unsightly condition, and or have lost their natural shape due to dead branches, excessive pruning, inadequate or improper maintenance, or any other causes due to the Contractor’s negligence. Any plant that shows 25% defoliation shall be considered unhealthy.

END OF SECTION