# TABLE OF CONTENTS

## INVITATION TO BID

## SAMPLE CONTRACT

## DIVISION 01 - GENERAL REQUIREMENTS

- 01010 Summary of Work
- 01100 Alternate Bid Items
- 01200 Project Meetings
- 01300 Submittals
- 01352 Construction Indoor Air Quality Management
- 01450 Environment Protection
- 01500 Construction Facilities
- 01524 Construction Waste Management
- 01600 Material and Equipment
- 01630 Substitutions and Product Options
- 01700 Construction Procedures
- 01710 Contract Closeout
- 01720 Cleaning
- 01730 Project Record Documents
- 01740 Warranties

## DIVISION 02 – 05

Not Used

## DIVISION 06 - WOOD

- 06100 Rough Carpentry
- 06200 Finish Carpentry

## DIVISION 07 - THERMAL AND MOISTURE PROTECTION

- 07200 Building Insulation
- 07270 Firestopping
- 07920 Sealants

## DIVISION 08 - DOORS AND WINDOWS

- 08110 Metal Doors and Frames
- 08210 Wood Doors
- 08306 Access Panels
- 08500 Aluminum Windows
- 08710 Finish Hardware
- 08800 Glazing

## DIVISION 09 - FINISHES

- 09250 Gypsum Wallboard
- 09510 Acoustical Ceilings
- 09650 Resilient Flooring
- 09900 Painting
DIVISION 10 - 14

Not Used.

DIVISION 15 - MECHANICAL

15050 Mechanical General Provisions
15800 Heating, Ventilating and Air Conditioning

DIVISION 16 - ELECTRICAL

16519 Low-Voltage Electrical Power Conductors & Cables
16526 Grounding and Bonding for Electrical Systems
16533 Raceways & Boxes for Electrical Systems
16553 Identification for Electrical Systems
16600 Lighting
16726 Wiring Devices
16830 Structured Cabling

END OF SECTION
The San Ramon Valley Fire Protection District (hereinafter referred to as “SRVFPD”) is requesting bid proposals for the services of a qualified BIDDER or BIDDERS to provide all equipment, labor and materials for the Fire Station 34 Remodel Project at 12599 Alcosta Blvd., San Ramon, CA, according to the specifications of the SRVFPD as detailed in the Scope of Work. Proposed submittals should include methodology for the provision of the services listed below, as well as any other pertinent information regarding equipment to be used, technician qualifications, etc., and should conform to at least the minimum qualifications listed in this document.

Scope of Work

Please refer to “Fire Station 34 Remodel” Plans dated October 1, 2018 and Technical Specifications Dated October 12, 2018 (Exhibit A and B).

Parts and Supplies

CONTRACTOR shall provide all labor, parts, equipment and supplies to perform the work as specified.

Award of Contract

SRVFPD reserves the right to reject any and all Bid Proposals and to waive irregularities in the Bid Proposal procedure.

The award of the contract, if awarded, will be to the qualified BIDDER(s), whose Bid Proposal represents the lowest responsible and responsive bid and complies with the requirements prescribed. Consideration will be given, but not limited to, the bid price, BIDDER’S past work performance, references from other employers similar to the SRVFPD, ability to meet the minimum specifications, ability to obtain insurance coverage, possession of and ability to retain qualified personnel, possession of licenses and certifications, possession of equipment, and tools necessary to complete the work specified and compliance with equal opportunity employment standards. Such award, if made, will be made within sixty (60) calendar days after the closing date and time set for receiving Proposals.
Award of Contract (cont’d)

All Bids will be compared on the basis of the information provided and detailed in CONTRACTOR’S Bid and the services required in the contract documents.

Failure of CONTRACTOR to execute the proposed contract and return same to the SRVFPD with evidence of the insurance specified in said contract within ten (10) working days after receiving the contract for execution shall be just cause for the SRVFPD to withdraw its acceptance of the Bid.

The SRVFPD reserves the right to reject any or all Bid Proposals received as the public good may require. All BIDDERS are subject to the reference checks and all Bid Proposals are subject to evaluation of the required specified information submitted before a final determination of award of contract to the successful BIDDER(s) is made as determined by the SRVFPD.

Questions regarding Bid Proposals should be directed in writing to: Jeff Katz, JKA Architecture (jeffi@jeffkatzarchitecture.com).

Additions, Deletions or Changes

The SRVFPD reserves the right to add, delete or change areas under this Agreement and may do so upon giving written notice to CONTRACTOR. If these changes cause an increase or a reduction in the maintenance costs included in this Agreement, they shall be readjusted and, when agreed upon, incorporated into the Agreement.

Term

The term of the Agreement shall be for a period of three months (3) from the date of execution of the Agreement.

Insurance Requirements – Types and Limits

Contractor, at Contractor’s own expense, shall maintain the following insurance policies with insurers possessing a Best’s minimum rating of A+.

a. General Liability Coverage. Contractor shall maintain commercial general liability insurance in an amount not less than one million dollars ($1,000,000) per occurrence for bodily injury, personal injury and property damage. If a commercial general liability insurance policy or other policy with a general aggregate limit is used, either the general aggregate limit shall apply separately to the work to be performed under this Agreement, or the general aggregate limit shall be at least twice the required occurrence limit.

b. Automobile Liability Coverage. Contractor shall maintain automobile liability insurance in amounts not less than $1,000,000 per occurrence for bodily injury and
Additional Insured Requirements (cont’d)

property damage for all activities arising out of or in connection with the work to be performed.

Additional Insured Requirements

a. **Additional Insureds.** District and its elected or appointed officers, directors, officials, employees, agents, volunteers, attorneys, and representatives shall be covered as additional insured for general liability and automobile liability coverage with respect to liability arising out of work performed by or on behalf on Contractor, including materials, parts or equipment furnished in connection with such work or operations.

b. **Contractor’s Primary Policy.** This policy shall be considered primary insurance as to the District, its elected or appointed officers, directors, officials, employees, agents, volunteers, attorneys, and representatives. Any insurance maintained by the District, including any self-insured retention the District may have, shall be considered excess insurance only and shall not be required to contribute to a loss that should otherwise be paid by Contractor’s insurer.

c. **Separate Coverage.** Contractor’s general liability and automobile liability insurance shall act for each insured and additional insured as though a separate policy had been written for each, except with respect to the limits of liability of the insurer.

d. **Waiver of Subrogation.** In addition, Contractor’s insurance company for general liability and automobile liability coverage shall waive the right of subrogation.

e. **Failure to Report.** Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the District, its elected or appointed officers, officials, employees, agents and volunteers.

f. **30-Day Cancellation Notice.** Contractor’s insurer shall unconditionally provide thirty (30) days written notice of any cancellation of coverage by certified mail return receipt requested.

Scheduling

A detailed schedule for completion should be included in proposal submittals, as listed in the “Instruction to Bidders” and “Bidder’s Acknowledgment” of this document. Actual schedule will be determined during the drafting of the contract, between CONTRACTOR and the SRVFPD’s Project Manager and agreed upon prior to the start of work.

The CONTRACTOR shall conduct the work required in such a manner as to cause the least amount possible of interference to the public and the general operation of the SRVFPD. The SRVFPD may determine under special circumstances that the work
Scheduling (cont’d)

should be performed outside of the regular business hours. In these instances, SRVFPD shall provide ample notice, when possible, to CONTRACTOR.

Safety

Safe work practices shall be enforced at all times. Protective gear and appropriate clothing shall be worn and utilized at all times and shall comply with all local, State and Federal safety regulations.

All services and merchandise must comply with the California State Division of Industrial Safety Orders and O.S.H.A. requirements. CONTRACTOR shall plan and conduct the work in a manner that will safeguard all persons from injury and shall take all precautions required by applicable regulations of the State Department of Industrial Relations. All machinery shall arrive at the work site in good, safe working condition.

Under no circumstances shall any repair work be conducted on any machinery at the job site without the consent of the SRVFPD’s Project Manager or designee. All machinery shall be maintained according to the manufacturer specifications. Machinery, which has defective or missing safety devices, shall not be used at any time. Machinery shall not be used in unsafe environmental conditions. The exact number of people required by the manufacturer specifications shall operate all machinery. Generally accepted safety practices shall be used at all times.

Performance

The SRVFPD shall, throughout the life of the contract, have the right of reasonable rejection and approval of staff or subcontractor assigned to the work by the CONTRACTOR. If the SRVFPD reasonably rejects staff or subcontractors, the CONTRACTOR must provide replacement staff or subcontractors satisfactory to the SRVFPD in a timely manner and at no additional cost to the SRVFPD. The day-to-day supervision, personnel safety training and the control of the CONTRACTOR’S employees and subcontractors are solely the responsibility of the CONTRACTOR.

Supervision

Work performed by any worker assigned to perform duties related to this Agreement shall be directly employed and supervised on site by the CONTRACTOR. The CONTRACTOR shall perform all management necessary, including, but not limited to: the technical supervision, compliance with safety regulations practices.
Wages

Pursuant to Section 1770, et seq., of the California Labor Code, the successful BIDDER(s) shall not pay less than the prevailing rate of per diem wages as determined by the Director of California Department of Industrial Relations. BIDDERS may obtain information regarding prevailing rate per diem by contacting the California Department of Industrial Relations.
Instructions to Bidders

Examination of Specifications, Sites and Contract

BIDDER(s) shall examine carefully the site where the services are to be provided, the specifications, and the contract forms therefore. A mandatory pre-bid conference will be held on Tuesday, October 30, 2018, 10:00am at Fire Station 34 located at 12599 Alcosta Blvd., in San Ramon, CA. The submission of a Bid Proposal shall be conclusive evidence that the BIDDER has investigated and is satisfied as to the conditions to be encountered, as to the character, quality and quantities of work to be performed and materials to be furnished, and as to the requirement of the Bid Proposal, specifications, and the contract.

Bidder Questions and Answers

Bidders must direct all questions about the meaning or intent of Bidding Documents to Architect: Jeff Katz Architecture, 280 Bettencourt Street, Sonoma, CA 95476, jeff@jeffkatzarchitecture.com in writing (via email). Interpretations or clarifications considered necessary by Owner in response to such questions will be issued by written Addenda posted to the District’s website. It is the bidders’ responsibility to continually check the website for any addenda. Owner may not answer questions received less than seven Days prior to the date for opening Bids. Only questions answered by formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect, and Bidders shall not rely on oral statements.

Duty to Examine the Site

BIDDER shall examine carefully the specifications and be familiar with the site where the services are to be provided.

Bid Proposal Requirements

1. A completed Bidder’s Acknowledgment Form.
2. Signed Guarantee Form.
3. Schedule for Completion.
4. Provide a list of three (3) local references of projects completed by BIDDER’S company involving similar work completed during the last two (2) years. Include the references’ current phone number and a description of the project completed.
5. A list of any subcontractors which will be used.
6. Proof of current and valid insurance according to the limits and conditions specified.
7. Copies of Licenses and Certificates.
Note: Additional work which may be necessary will be completed by the CONTRACTOR for an agreed upon price submitted by the CONTRACTOR and accepted by the SRVFPD.

Interested firms should submit, in a sealed envelope, properly marked, a Bid Proposal and/or Qualifications to complete the requested services. Each envelope shall be labeled on the outside of the envelope: Proposal for “Fire Station 34 Remodel Project” and include the BIDDER’S Business Name, BIDDER’S Name, BIDDER’S License Number (when applicable), BIDDER’S phone number and current mailing address. Proposals are due by 2:00pm, on Wednesday, November 14, 2018, and should be addressed to Support Services Division, San Ramon Valley Fire Protection District.

Bid Proposal Requirements (cont’d)

Bid Proposals can be mailed or delivered to 1500 Bollinger Canyon Road, San Ramon, CA 94583. Faxed copies of Bid Proposals or Proposal Forms will not be accepted.

All Bid Proposals shall, in a clear and legible manner, include the following information pertaining to the delivery of services:

- **BIDDER’S Qualifications**  A list of references, companies and agencies or other persons familiar with the BIDDER’S work performance shall be listed for the purpose of obtaining specific information about the BIDDER(s). The BIDDER(s) must reference a minimum of three (3) projects. If the BIDDER(s) does not have a sufficient number of references to provide, then a detailed description of the BIDDER’S capabilities may be substituted. The description shall include: number of years of experience, degrees and certifications retained by the BIDDER, financial stability of the BIDDER evidenced by the BIDDER’S capability and ability to obtain the necessary insurance and any other pertinent information relevant to the BIDDER’S experience. Referenced projects shall include: the current mailing address of the reference, current phone number of the reference and the name of the contract or representative for each project referenced.

- **Insurance Information**  Scope of insurance, limits of insurance and any other insurance provisions.

- **Proposed Schedule and Methodology of work**.

**Addenda**

SRVFPD may, when necessary, and at a time prior to the closing date and time, issue addenda to the Specifications to amend, clarify or correct matter contained therein. Such addenda shall constitute a part of said Specifications and shall be equally binding with them. Addenda will be forwarded to all prospective BIDDERS, insofar as they are known to the SRVFPD.
Opening of Bid Proposals

Bid Proposals will be received up to the time and place indicated in the published Legal Notice. Bid Proposals received after the time and date specified will not be accepted and will be returned to the BIDDER. Bid Proposals will be opened immediately following the time indicated in the published Legal Notice; however, actual selection of CONTRACTOR will be pending review of qualifications.

Relief of BIDDER(s)

Attention is directed to the provisions of Government Public Contract 10200 to 10205 inclusive concerning relief of a BIDDER(s) and in particular to the requirement therein, that if the BIDDER claims a mistake was made in BIDDER’S Bid Proposal, the BIDDER shall give the SRVFPD written notice within five (5) days after the closing date and time of the acceptance of the alleged mistake, specifying in the notice in detail how the mistake occurred.

Rejection of Bid Proposals

Bid Proposals may be rejected if they show any alteration of form, additions not called for, conditional Bid Proposals, incomplete Bid Proposals, erasures or irregularities of any kind.

The SRVFPD reserves the right to reject any or all Bid Proposals for improper form upon finding the BIDDER(s) to be irresponsible or incompetent, collusion, unbalanced price schedule, inability to perform the contract or any other reason found to be detrimental to the SRVFPD’s interest or welfare. Neither the SRVFPD nor the SRVFPD’s Project Manager shall be deemed responsible for any oral clarification or will same be binding.

Evaluation of Proposals

All Bid Proposals will be evaluated to determine if the BIDDER(s) are qualified based on the required specified information submitted in the Bid Proposals. Award of contract will be to the qualified BIDDER(s) presenting the lowest price for the requested services. The SRVFPD reserves the right to award one or more contracts, as the public good may require. Bid Proposals submitted by BIDDER(s) determined to be unqualified to perform the requested services as specified, or which do not meet the minimum requirements, or omit information, or are not eligible and/or are not completed correctly as determined by the SRVFPD, will be rejected. Rejected Bid Proposals are sent back to the submitting BIDDER with a letter explaining why the Bid Proposal was rejected.
BIDDER’S Acknowledgment

San Ramon Valley Fire Protection District
Support Services Department
1500 Bollinger Canyon Road
San Ramon, CA  94583

Date______________________________

Bid Price $_____________________

Additive Alternate #1 Bid Price $_____

The undersigned, as BIDDER, declares that we have received and examined the documents for the Fire Station 34 Remodel Project, San Ramon, CA, and have reviewed the job site in San Ramon and will contract with the SRVFPD, on the form(s) of agreement provided herewith, to do everything required for fulfillment of the contract for the complete work as outlined within the time span specified, at the prices and on the terms and conditions contained herein.

We agree that the following shall form a part of this Bid Proposal:

1. A completed Bidder’s Acknowledgment Form.
2. Signed Guarantee Form.
3. Schedule for Completion.
4. Provide a list of three (3) local references of projects completed by BIDDER’S company involving similar work completed during the last two (2) years. Include the references’ current phone number and a description of the project completed.
5. A list of any subcontractors which will be used.
6. Proof of current and valid insurance according to the limits and conditions specified.
7. Copies of Licenses and Certificates.

If our Bid Proposal is accepted, we agree to sign the agreement and to furnish the required documents within ten (10) calendar days after receiving written notice of the award of the contract.

The SRVFPD reserves the right to reject any or all Bid Proposals or to accept only a portion of the Bid Proposal or to waive any informality in the Bid Proposal. BIDDERS submitting a Bid Proposal may make a written request to the Assistant Fire Chief of Support Services prior to the closing period, requesting permission to amend a Bid Proposal without penalty.
A Bid Proposal presented to the SRVFPD may be withdrawn prior to the closing date and time. A written request for withdrawal, made to the Assistant Fire Chief of Support Services and signed by the BIDDER(s) will be accepted up to the closing date and time. Once withdrawn, the Bid Proposal cannot be resubmitted. A BIDDER(s) that has withdrawn its Bid Proposal may not work as a subcontractor for the BIDDER(s) awarded the contract.

The BIDDER(s) declares that the only person or parties interested in the Bid Proposal as principals are those named herein and that the Bid Proposal is made without collusion with any other person, firm or corporation.

________________________________________
Company Name or Individual BIDDER

________________________________________
Address of BIDDER

________________________________________
Signature of BIDDER

________________________________________
Title of Signator

________________________________________
State of Incorporation
Fire Station 34 Remodel Project, San Ramon, CA
Guarantee Form

We, _____________________________(Company Name or Individual), hereby guarantee that all work performed for the Fire Station 34 Remodel Project, will be guaranteed for a period of One (1) Year from the date of acceptance by the San Ramon Valley Fire Protection District (“SRVFPD”). During the One (1) Year guarantee period of the Fire Station 34 Remodel Project, we guarantee other adjacent work which may be displaced in so doing, that may prove to be defective in its workmanship, without any expense whatsoever to the SRVFPD.

Within fifteen (15) days after being notified in writing by the SRVFPD of any defects in the work, we agree to commence and prosecute with due diligence all work necessary to fulfill the terms of this Guarantee, and to complete the work within a reasonable period of time, and in the event of our failure to so comply, we collectively and separately do hereby authorize said SRVFPD to proceed to have such work done at our expense and we will honor and pay the cost and charges therefore upon demand.

Dated: ________________________________

By: _________________________________

Title: _______________________________
CONTRACT FOR
JOB # __________

BETWEEN THE SAN RAMON VALLEY FIRE PROTECTION DISTRICT AND GARLAND/DBS, INC. FOR THE FIRE STATION #34 REMODEL PROJECT

1.) This CONTRACT is made at Contra Costa County as of______, (“Effective Date”), by and between the San Ramon Valley Fire Protection District located at 800 San Ramon Valley Blvd, Danville, CA 94526 (hereinafter designated the “CUSTOMER”), and ________, located at __________ (hereinafter designated the “CONTRACTOR”).

2.) The CONTRACTOR shall furnish all material, labor, equipment, and tools necessary for the Station 34 Remodel Project located at ________, as well as all work incidental and pertinent thereto, (hereinafter designated the “PROJECT”) all in accordance with the original proposal #________ dated ________ submitted by the CONTRACTOR (hereinafter together designated the “Specifications”), a copy of which is attached hereto as Exhibit A and incorporated herein. In the event of any conflict, ambiguity, or inconsistency between the terms contained in this CONTRACT and the Exhibits, the terms set forth in this CONTRACT shall govern and control.

3.) The term of the CONTRACT shall begin on the Effective Date first written above, and shall be completed ________ days thereafter, unless sooner terminated as permitted herein, or unless extended by agreement of the parties set forth in writing. The work shall commence within ten (10) days from the date that CONTRACTOR receives a copy or original of the fully executed CONTRACT, which receipt shall be considered Notice to Proceed. The CONTRACTOR is required to submit to the CUSTOMER a Certificate of Insurance and Performance and Payment bonds prior to commencing work. In addition, the work shall be scheduled as agreed upon by the parties.

4.) The sums to be paid to the CONTRACTOR shall be at the bid price(s) shown on the Specifications (Exhibit A), and the total to be paid to CONTRACTOR shall be a maximum of $________, as set forth in the purchase order and Exhibit A. Invoices shall provide details of all PROJECT expenses as permitted in this CONTRACT. CONTRACTOR shall apply no late charges, interest or penalties to any invoice or charges for services until 30 days from the CUSTOMER receipt of the invoice. If this CONTRACT is terminated for convenience for any reason, then the CONTRACTOR shall be paid pro rata for all services performed, materials purchased, and administrative costs incurred, including lost profit, to the effective date of termination.

5.) If the CUSTOMER wishes to terminate the CONTRACT for cause due to the failure of CONTRACTOR to perform as required under this CONTRACT and/or in a manner consistent with the degree of care and skill ordinarily exercised by members of the same profession currently practicing under similar circumstances, then the CUSTOMER must provide the CONTRACTOR with written notice of said failure to perform. The
CUSTOMER must give ten (10) working days from the CONTRACTOR’s receipt of the Notice to Cure for the CONTRACTOR to cure or take reasonable action to commence to cure the performance concerns specified. If the CONTRACTOR does not take appropriate action within the ten (10) day period, the CUSTOMER may issue a Final Notice to Cure. The CONTRACTOR will have an additional five (5) working days from the receipt of the Notice to Cure to cure or take reasonable action to commence to cure before the CUSTOMER can terminate the CONTRACT. If the CONTRACTOR is terminated for cause, the CUSTOMER may provide or employ any necessary labor and materials in lieu of CONTRACTOR to finish part or all of the work under the CONTRACT or to supplement the work of CONTRACTOR, and to deduct the cost thereof from any money, then due or thereafter to become due to the CONTRACTOR; and if such cost shall exceed the balance due to CONTRACTOR, then the CONTRACTOR shall pay the difference to the CUSTOMER.

6.) CUSTOMER may issue subsequent modifications to the Purchase Order(s) for additional work that was not known or included in the Specifications that is found to be needed during the work on the PROJECT to complete the PROJECT over and above the amount set forth in this paragraph four (4) and in Exhibit A. CONTRACTOR must seek approval from the CUSTOMER before performing any additional work. The CUSTOMER must provide the CONTRACTOR written documentation of the modification to the Purchase Order within three (3) business days of verbal approval. CONTRACTOR is not obligated to perform additional work until written modification has been received from the CUSTOMER, but may commence work based upon a reasonable assumption that written modification will be issued. Incidental additional work performed by the CONTRACTOR without CUSTOMER consent will be evaluated and considered for payment based upon the work’s merit. If the CUSTOMER determines the incidental additional work was not included in the original scope of the PROJECT and required for the CONTRACTOR’s uninterrupted performance in fulfillment of the contract, then the CUSTOMER will approve the CONTRACTOR’s request for payment for incidental additional work.

7.) All the work done under this CONTRACT shall be performed under the oversight of Fire Chief Paige Meyer or his designee, the CUSTOMER’S representative. All notices hereunder shall be (a) in writing; (b) delivered to the representatives of the parties at the addressees set forth in the Specifications, unless changed by either party by notice to the other party; and (c) effective upon receipt.

8.) The CONTRACTOR shall furnish the CUSTOMER with a performance or contract bond and a labor and material bond, each in the amount of $________ a Certificate of Workers’ Compensation, and a Certificate of Insurance evidential of comprehensive general liability insurance and property insurance with minimum coverage in amounts reasonable to or exceeding what is normally expected for a comparable project in size and scope. Further, said Certificate of Insurance shall name San Ramon Valley Fire Protection District as an additional insured. Said Certificate of Insurance shall also provide that at least thirty (30) days written notice shall be given to the CUSTOMER of any material change in, or cancellation of, said insurance.
9.) Should the CONTRACTOR at any time refuse or neglect to supply a sufficiency of properly skilled workers or materials of the proper quality, or fail in any respect to prosecute the work herein described with promptness and diligence, or fail in the performance of any of the agreements contained herein, the CUSTOMER shall have the right to immediately suspend all work, or any part thereof under this CONTRACT, upon the CUSTOMER’s issuance of a stop work notice to the CONTRACTOR and the CONTRACTOR’s confirmed receipt of the stop work notice. The work shall continue to be suspended until such time as the CUSTOMER and CONTRACTOR have come to a mutual agreement on how the work under the CONTRACT shall proceed. Should the CONTRACTOR continue to refuse or neglect to supply a sufficiency of properly skilled workers or materials of the proper quality, or fail in any respect to prosecute the work herein described with promptness and diligence, or fail in the performance of any of the agreements contained herein, then the CUSTOMER may, after following the procedures listed in Section 5 above, terminate the CONTRACT for cause.

10.) The CONTRACTOR shall indemnify, save harmless, and defend the CUSTOMER from and against all losses, claims, demands, payments, suits, actions, recoveries, and judgments of every nature and description, made, brought, or recovered against the CUSTOMER by reason of any negligent act or omission of the CONTRACTOR, its agents, its subcontractors, or its employees, in the execution of the work herein contracted for.

11.) The CONTRACTOR or CUSTOMER has the right to request and be granted a Termination for Convenience from the CONTRACT obligations if there is a joint determination from both the CUSTOMER and the CONTRACTOR that the termination is in the best interests of both parties, or if the CONTRACTOR or CUSTOMER believes the Termination for Convenience to be in its best interests because a timely resolution, within ten (10) days from the CUSTOMER’S receipt of written notification, will not be provided with regard to requests for information (RFI), request for clarification, or requests for modification to the Purchase Order(s) due to differing site conditions, vague Specifications, or unforeseen circumstances. Under a Termination for Convenience, the CONTRACTOR or CUSTOMER shall be reimbursed for all justifiable costs including price of supplies, services delivered, and administrative expenses, including lost profit under the CONTRACT or Purchase Order.

12.) This CONTRACT shall be deemed to contain all the terms and conditions agreed to between the parties, who both agree that no representations or promises of any kind whatsoever have been made other than herein contained, and this CONTRACT shall be binding upon both parties and their respective heirs, administrators, executors, successors, and assigns.

13.) This CONTRACT is contingent upon receipt of a written purchase order from CUSTOMER. All terms must be agreed upon by both parties.

14.) CUSTOMER shall have the right to approve all subcontracts or assignments of work equal to or exceeding $10,000. CUSTOMER shall not unreasonably withhold, delay or condition subcontracting or assignments, but may express final and binding disapproval of a proposed assignee or subcontractor. Should the CONTRACTOR be forced to choose a
different subcontractor/assignee that is of higher cost than the initial subcontractor/assignee, due to the CUSTOMER’s disapproval, the CONTRACTOR shall be able to request and will receive approval from the CUSTOMER for a modification to the CONTRACT to cover the additional cost. CONTRACTOR shall remain responsible for the work of any agent or independent contractor to whom it assigns its Work, and any assignment or subcontract shall incorporate the terms of this Contract into its contract delegating its Work.

15.) If the PROJECT involves construction of a public improvement at a cost exceeding the threshold for payment prevailing wage rates of pay, each laborer, workman or mechanic employed by the CONTRACTOR for performance of the PROJECT herein described or by the subcontractor shall be paid not less than the minimum rate of pay for the applicable pay classification. The CONTRACTOR and their subcontractors who are subject to the requirements of paying prevailing wages shall keep full and accurate payroll records covering all disbursements of wages to their employees to whom they are required to pay not less than the prevailing rate of wages. The CONTRACTOR and its subcontractors shall deliver to the CUSTOMER a certified copy of their respective payrolls, within two weeks of the CUSTOMER’s request, for each pay period requested by the CUSTOMER.

16.) Payments to the CONTRACTOR shall be made at the rate of ninety-five percent (95%) of the approved partial payment estimate for each monthly progress billing. The CUSTOMER will retain five percent (5%) of every approved partial payment. The retained amount will be paid to the CONTRACTOR no later than thirty (30) days following Final Acceptance of the work. Upon completion and acceptance of the work, the CUSTOMER shall issue a certificate attached to the final payment request that the work has been accepted by it under the terms, promises and conditions of the CONTRACT.

17.) CONTRACTOR has been employed under this Contract as an independent contractor in order to construct its portion of the PROJECT. CONTRACTOR agrees that no authority has been conferred upon it by CUSTOMER to hire any person(s) on behalf of CUSTOMER, and CUSTOMER undertakes no obligation of any sort to CONTRACTOR's employees or subcontractors. It is understood and agreed that the CONTRACTOR shall select, engage, and discharge its employees, agents, or servants and otherwise direct and control their services. CONTRACTOR will also comply with all laws concerning qualification to do business and engage in the work involved under this CONTRACT and will file all returns and reports required of it and pay all taxes and contributions imposed upon it.

18.) CONTRACTOR agrees not to discriminate against any employee or applicant for employment because of age, race, color, religion, sex, or national origin.

19.) The CUSTOMER shall not be considered to have accepted possession of the work under this CONTRACT until a notice of completion is issued to the CONTRACTOR by the CUSTOMER or CUSTOMER’s representative, or payment of the full CONTRACT compensation is received by the CONTRACTOR, unless the Parties otherwise mutually agree.
20.) CONTRACTOR, at all times during its performance of its work under this CONTRACT, shall keep the work site, grounds, and roof tops surrounding the work site free from accumulation of waste materials or rubbish caused by its activities. Upon completion of the work under this CONTRACT, the CONTRACTOR shall promptly remove all its waste materials and rubbish from and about the work site, as well as, its tools, construction equipment, machinery, and surplus materials, as to leave the work site "Broom Clean" or its equivalent.

21.) If hazardous materials, as defined by California or Federal law, are found at the PROJECT site during the performance of work under this CONTRACT, then CONTRACTOR shall remove and dispose of such hazardous materials in compliance with California and Federal law.

22.) The parties agree that time is of the essence in the performance of this CONTRACT.

23.) Liquidated Damage Amounts
As liquidated damages for delay Contractor shall pay Owner five hundred dollars ($500.00) for each Day that expires after the time specified herein for Contractor to achieve Substantial Completion of the entire Work, until achieved.

24.) The situs for the acquisition of all materials required for completion of the PROJECT shall be the City of San Ramon in Contra Costa County, California.

25.) The law applicable to this CONTRACT is hereby agreed to be the law of California, the state where the PROJECT is situated. The parties agree that the proper venue for action, suit, or other litigation arising under this agreement shall lie in the courts of Contra Costa County, California. In the event that legal action is instituted to enforce this agreement, each party agrees to bear its own attorney fees and costs while waiving the right to collect attorney fees and costs from the opposing party. Each party also agrees to waive its right to have any pending action or trial heard by a jury.

[SIGNATURE PAGE TO FOLLOW]
IN WITNESS WHEREOF, authorized representatives of each party to this CONTRACT, indicating their party’s approval of the terms herein, have signed as of the dates set forth below.

WITNESSES:

1. __________________________
2. __________________________

GARLAND/DBS, INC.

By: __________________________

Printed Name

Title

Tax ID. No.

Date: 8/6/2018

WITNESSES:

1. __________________________
2. __________________________

SAN RAMON VALLEY FIRE PROTECTION DISTRICT

By: __________________________

Date: 7/31/2018

And

By: __________________________

Date: 7/31/2018
ROOFING MATERIAL AND SERVICES PROPOSAL

Fire Station #31
San Ramon Valley Fire Protection District
800 San Ramon Valley Blvd
Danville, CA 94526

Date Submitted: 07/12/2018
Proposal #: 25-CA-180714
MICPA # 14-5903
California General Contractor License #: 949380

Purchase orders to be made out to: Garland/DBS, Inc.

Please Note: The following budget/estimate is being provided according to the pricing established under the Master Intergovernmental Cooperative Purchasing Agreement (MICPA) with Cobb County, GA and U.S. Communities. This budget/estimate should be viewed as the maximum price an agency will be charged under the agreement. Garland/DBS, Inc. administered a competitive bid process for the project with the hopes of providing a lower market adjusted price whenever possible.

Scope of Work: Cold Apply Two Ply System

1. Carefully remove existing coping cap metal along the parapet wall and dispose of.
2. Carefully remove existing counter flashing and dispose of.
3. Remove all roof penetration jacks and properly dispose of.
4. Remove existing roof system down to the substrate and properly dispose of at an approved landfill.
5. Inspect wood decking for any delaminated or dry rot of any plywood sheets, if any dry rot is found it will be notify to property management and charge as a change order basis.
6. Install up to 2” of POLY-ISO insulation over entire flat roof. Install Poly-Iso per manufacturers specifications and recommendations.
7. Install ¼ Dens deck over entire flat roof. Install Dens deck per manufacturer’s recommendations and specifications.
8. Over coverboard Install one layer of Stress Base 80 and Stress Ply Plus Cap (white) with cold apply Asphalt. Install in a shingle fashion from low to high point of roof to promote positive drainage.
9. Install stress Base 80 sheet and Stress Ply plus cap sheet with cold apply to all flashings.
10. Apply Pyramic Base Coat over new installed Cap sheet. Apply 1.5Gal. per 100SF.
11. Apply Pyramic Top Coat at the rate of 1.5Gal per 100SF.
12. Install all new Coping Cap metal over perimeter parapet wall.
13. Remove all debris from roof and ground daily.
14. After completion of project, District will receive 30 Year No Dollar Limit and Materials Warranty.

Note: ACM needs to be removed and disposed of by certified abatement professional.

Scope of Work: HVAC Systems Inclusions
1. Provide and Install new roof top ductwork.
2. Provide and Install new roof top ductwork stations.
3. Connections/transitions to existing roof penetrations.
4. Connections/transitions to existing roof top units.
5. New flex connections at the existing units, units Layout and installation drawings.
6. One-year warranty for equipment provided by ASI

Proposal Price Based Upon Market Experience: $423,755

Proposal Price Based Upon Market Experience: NO ODOR $445,056

Unforeseen Site Conditions:
Plywood Substrate Replacement $143 per Sheet

Potential issues that could arise during the construction phase of the project will be addressed via unit pricing for additional work beyond the scope of the specifications. This could range anywhere from wet insulation, to the replacement of deteriorated wood nailers. Proposal pricing valid through 12/31/2018.

Clarifications/Exclusions:
1. Sales and use taxes are included. Please issue a Tax Exempt Certificate.
2. Permits are excluded.
3. Bonds are included.
4. Masonry work is excluded.
5. Temporary protection is excluded.
6. Any work not exclusively described in the above proposal scope of work is excluded.
7. Project will be completed within 45 calendar days from start of construction.
If you have any questions regarding this proposal, please do not hesitate to call me at my number listed below.

Respectfully Submitted,

Steve Rojek
Garland/DBS, Inc.
(216) 430-3613
PART 1 - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. Work of this Contract comprises construction of interior modifications for San Ramon Fire Station 34 complete including fire protection modifications, mechanical, electrical and incidental related work.

B. Construction shall be in conformance with the California Building Code, current adopted edition, and all local codes and ordinances.

C. The Standard Specifications for Public Works Construction (2006) commonly referred to as the "Green Book" (excluding Sections 1-9), Current Standard Drawings of the City of San Ramon, Current Regional Standard Drawings, California Department of Transportation (CalTrans) Standard Plans (July 2002), and State of California Manual of Traffic Controls (1990), are made a part of these Specifications. All provisions applicable to the work to be performed in accordance with these drawings and Special Provisions if this project shall apply whether specifically referred to or not. References to these Standard Specifications have been made in the Special Provisions. These references apply directly to the work the Contractor is to perform.

1.02 CONTRACTOR RESPONSIBILITIES

A. In addition to the work described elsewhere in the Contract Documents, the Contractor shall be responsible for:

1. Coordination with all utility companies and public agencies including but not limited to, City of San Ramon, Pacific Gas and Electric, ATT Telephone, and Comcast Cable Television.

B. Cautions: Because of the limitations of available as-built information, there is no assurance that all existing utilities are shown. The contractor shall proceed with caution to ensure that all utilities encountered, whether or not of record, shall be protected from damage. The contractor shall take all precautions necessary to protect himself, all his employees and subcontractors, and the general public from injury which may result from contact with utility services.

C. The District has endeavored to determine the existence of utilities at the site of the work from the records of the District of known utilities in the vicinity of the work. The positions of these utilities as derived from such records are shown on the plans.

D. No excavations were made to verify the locations shown for underground utilities. The service connections to these utilities are not shown on the plans. It shall be the responsibility of the Contractor to determine the exact location of all service connections. The Contractor shall make his own investigations, including exploratory excavations, to determine the locations and type of service connections, prior to commencing work which could result in damage to such utilities. The Contractor shall immediately notify the Architect as to any utility discovered by him in a different position than shown on the plans or which is not shown on the plans.

E. The Contractor shall pothole, and locate, existing service lines to prevent damage and inconvenience to the public. The Contractor shall be responsible for the replacement of any disturbed utility lines and sprinkler systems as a part of this Contract, and full compensation for such work shall be considered as included in the Contract Price. The public utility, where they are the District, shall have the sole discretion to perform repairs or relocation work, or permit the
Contractor to do such repairs or relocation work at a reasonable price. An existing utility which is damaged as a result of the Contractor's operations shall also be removed or replaced at the Contractor's expense. The Contractor shall contact and coordinate with the utility and the District for the relocation and/or replacement of their facility within the work area.

F. If the Contractor, while performing the Contract, discovers utility facilities not identified by the District in the Contract Drawings or Specifications, it shall immediately notify the Architect and utility in writing.

G. The fact that existing utilities and improvements, either above or below the ground surface, are not shown on the drawings shall not relieve the Contractor of liability for complete and careful protection of said utilities or improvements from damage as specified herein.

H. All repairs to damaged utilities or improvements shall be inspected and approved by an authorized representative of the utility and/or District before being concealed by backfill or other work.

J. In all cases of alteration or relocation of service connections, the Contractor shall notify the customer being affected a minimum of four (4) hours prior to said alteration or relocation, and service connection shall be returned to service in an amount of time not to exceed four (4) hours or as agreed between the parties.

K. Damage to any existing utility by the Contractor that is discovered within one year after acceptance of the work by the District shall be repaired by the contractor at his expense.

1.03 CONTRACTOR USE OF PREMISES

A. The station will continue to be occupied and operational during the course of construction. Contractor shall coordinate daily with on duty personnel to communicate expected interruptions to service or operations.

B. The Contractor shall confine the storage of materials and the operations of his workforce to limits indicated by law, ordinances, permits, the drawings and direction of the Architect, and shall not unreasonably encumber the premises.

C. Contractor shall be limited to the immediate site area adjacent to the area of work for storage of all materials and equipment. No storage on adjacent streets or adjoining site areas will be permitted.

D. There shall be no accumulation of any debris, waste, surplus building materials in any portion of the job site. Remove all debris on a daily basis to a legal dumpster and arrange for disposal on a regular basis.

1. Refer to Section 01720, "Cleaning" for additional cleanup requirements.

1.04 SPECIAL CONDITIONS OF USE OF PREMISES

A. The maximum use of "low-noise emission products" as certified by the Environmental Protection Agency shall be made when available. No loud music will be permitted.

B. Harassment: There shall be no whistling, hooting, cat-calling or any other sort of verbal harassment of individuals passing by in the vicinity of the construction site.

C. Contractor and subcontractor workforce shall not park any vehicles in front of adjacent development. Street parking will be permitted, where allowed by law, on adjacent streets which do not contain residential development.
D. No alcohol or illegal drugs will be permitted on the premises.
E. Smoking shall be limited to designated areas assigned by the Architect. No smoking will be permitted at any time within the buildings.

1.05 RESTRICTIONS ON OPERATIONS
A. Restrictions upon interrupting utility services: Existing utility service must be maintained at all times.
   1. Ensure that new utility lines are complete including testing, except for the connections, before interrupting existing service.
   2. A minimum of 15 working days notice is required prior to making any utility cutovers.

1.06 JOB SITE SAFETY
A. In submitting a bid, Contractor assumes all responsibility for construction means and methods and the maintenance of job-site safety of the Contractor's own forces, subcontractors, agents of the District, consultants to the District, and the general public.
B. During the entire construction period, it shall be the responsibility of the Contractor to maintain conditions at the job site so as to meet in all respects the requirements of the Occupational Safety and Health Act, OSHA. This provision shall cover the Contractor's employees and all other persons working upon or visiting the site. To this end, the Contractor shall inform himself and his representative of OSHA standards.
C. All personnel on site are required to wear OSHA approved safety glasses and hardhats at all times.

1.07 SECURITY PROCEDURES
A. Contractor shall limit access to the site to persons involved in the work. Contractor shall completely enclose site with semi-permanent fencing (chain link).
   1. The Contractor shall be fully responsible to the District for acts of his subcontractors and of persons directly employed by him.
B. Contractor shall provide secure storage for materials for which the District has made payment and which are stored on site.
C. Contractor shall secure completed work as required to prevent loss.
   1. Protective methods shall be at the discretion of the Contractor as long as said methods comply with other provisions of the Contract.
   2. Wherever such damage does occur, the Contractor shall, at no expense to the District and as directed by the Architect, completely repair all damaged work.

1.08 SHORING AND BRACING
A. The Contractor shall be responsible for the design and construction of all needed shoring and bracing necessary to construct this project and shall have a licensed Civil Engineer design same. Costs for design of shoring and bracing shall be borne by the Contractor.
1. Shoring plans shall be submitted to the Architect a minimum of 10 days prior to commencing work.

B. Shoring is considered to be adequate sheeting, shoring, bracing, or equivalent method for (1) protection of life and limb which conform to applicable safety orders; (2) protection of existing underground and above ground private and public improvements; and (3) the remedy of any and all conditions encountered, regardless of depth, (including, but not limited to trench sloughing, pavement separation, etc.) during the construction of the project.

C. The Contractor shall notify the Architect if unusual or latent or presently unknown conditions are encountered which might affect the structural stability of work to follow, or if existing conditions are found to be different than those indicated.

1.09 COORDINATION

A. The Contractor shall check all drawings furnished him immediately upon their receipt and shall promptly notify the Architect of any discrepancies. Figures marked on drawings shall in general be followed in preference to scale measurements. Large scale drawings shall in general govern over small scale drawings. The Contractor shall compare all drawings and verify the figures before laying out the work and will be responsible for any errors which might have been avoided thereby.

B. Omissions from the drawings or specifications or the mis-description of details of work which are manifestly necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or mis-described details of the work, but they shall be performed as if fully and correctly set forth and described in the drawings and specifications. Coordinate work of the various sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items installed later.

1. Work not specifically indicated or specified but which is required for the completion of the work shall be provided in the same manner as similar work which is required or specified without additional charge to the District.

2. Where a portion of the work is drawn and the remainder is indicated in outline, the drawn portion shall also apply to all other like portions of the work. Where particular installation or details are indicated by outline, marked "typical" or are obviously intended to match similar items shown in greater detail elsewhere, they shall be completed as if fully drawn, detailed or specified in strict compliance with the requirements of other similar parts of the work.

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

1. The actual limitations of work in the various trades and/or sections of the specifications are the responsibility of the Contractor.

2. Where devices or items, or parts thereof, are referred to in the singular, it is intended that such reference shall apply to as many such devices, items or parts as are required to complete the work properly.

D. Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduits, as closely as practicable; make runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
1. The placement of pipes, conduit, etc., and the location, size and reinforcement of holes in the building structure shall conform to the structural drawings and specifications. When the requirements of the Mechanical, Electrical, Sprinklers, or other sections of the specifications or drawings are in conflict with the structural requirements, the structural requirements shall take precedence. Where the safety of the building structure is threatened, due to mechanical, electrical or other work or holes required for such work, modifications shall be made as directed by the Architect.

2. It is the Contractor's responsibility to coordinate the work so as to minimize conflicts and optimize efficiency.

E. In finished areas, except as otherwise shown, conceal pipes, ducts, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.

F. CORRELATION AND INTENT OF DOCUMENTS

1. In the event of discrepancies in the drawings and specifications, the following order of precedence shall prevail:

   a. Special Provisions
   b. General Provisions
   c. Summary of Work and Supplemental Conditions
   d. Project Drawings
      1). The descriptive writings on the drawings in preference to the symbol.
      2). The figures on the drawings in preference to the scale.
      3). The large scale drawings in preference to the smaller scale.
   e. The word of the technical specification.
   f. City Standard Drawings.
   g. Standard Specifications (Greenbook, current adopted edition).

2. It is the intent of the Documents to establish minimum quality and certain design standards that must be met for this project. All products and systems shall be installed in no less manner than required by the documents. However, it is the Contractor's responsibility to assure that all products and systems are provided and installed in the best manner known to the industry and in strict accordance with manufacturers' instructions. Contractors shall examine conditions and substrates as drawn, specified, or existing that will receive their work and advice the General Contractor, prior to bidding, of any conditions detrimental to their work or of aesthetic or design standards which they cannot meet.

3. The Contractor shall coordinate the layout of his work with that of any sub-contractors and with existing conditions. No additional costs will be paid by the District to resolve utilities routing problems or similar problems that could have been avoided by proper coordination among the subcontractors or by proper anticipation of potential problems by the General Contractor.

1.10 REFERENCE STANDARDS

A. For Products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
B. The date of the standard is that in effect as of the building permit date, except when a specific date is specified.

C. Obtain copies of standards when required by Contract Documents. Maintain copy at jobsite during progress of the specific work.

1.11 WORK BY OWNER

A. Items noted as "NIC" will be furnished and installed by the Owner.

1.12 OWNER FURNISHED PRODUCTS

A. Items noted as "OFCI" (Owner Furnished, Contractor Installed) will be furnished by the Owner and installed by the Contractor.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION
SECTION 01100
ALTERNATE BID ITEMS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included: To enable the Owner to complete the project with funds available or to compare total costs where alternative materials and methods might be used, alternates have been established as described in the drawings and in this Section of Specifications.

B. Related Work Described Elsewhere:

1. Materials and methods to be used in the Base Bid and in the Alternatives have been described on the drawings and in pertinent sections of these Specifications.

C. All alternatives described in this section are required to be reflected in the proposal submitted to the Owner. However, do not submit alternatives other than as described in this section, except as provided for in Section 01600, Substitutions.

D. If the Owner elects to proceed on the basis of one or more of the described Alternates, make all modifications to the work required in furnishing and installing the selected Alternate or Alternates to the approval of the Engineer, and at no additional cost to the Owner other than as proposed in proposal to Owner.

1.02 BASIS OF AWARD

A. The entire work described on the project plans and specifications shall be considered the base bid. Items identified below shall be considered alternate bid items. The basis of award for this project shall be the base bid only.

PART 2 - PRODUCTS

2.01 ALTERNATES

A. Additive Alternate No. 1:

1. General: The Contractor shall provide to the Owner the change in contract amount to replace the existing split system HVAC units serving the Bunk Rooms with new units as noted on mechanical drawings.

2. Base Bid: For the base bid include the contract sum for leaving the existing units in place and providing new ductwork as shown on the mechanical drawings.

PART 3 - EXECUTION

3.01 ADVANCE COORDINATION

A. Immediately after award of the Contract, or as soon thereafter as the Owner has made decision on which, if any, Alternatives will be selected, thoroughly and clearly advise all necessary personnel and suppliers as to the nature and extent of Alternatives selected by the Owner.
B. Use all means necessary to alert those personnel and suppliers involved as to all changes in the work caused by the Owner's selection or rejection of Alternatives.

END OF SECTION
SECTION 01200
PROJECT MEETINGS

PART 1 - GENERAL

1.01 PRE-CONSTRUCTION CONFERENCE

A. The Architect will schedule conference prior to Contractor occupancy.

B. Attendance: Owner’s Representatives, Engineer, Architect, Contractor, and major Subcontractors.

C. The purpose of the conference is to establish the working relationships between the District, the Architect and the Contractor during the construction of the project. Areas of responsibility, operational procedures, payment processing, and scheduling will be covered in detail.

1.02 PROGRESS MEETINGS

A. Contractor shall schedule and conduct progress meetings during the construction project.

   1. At a minimum, scheduled site meetings will be held every week during the course of construction at an agreed upon time.

B. The following are required to attend the progress meetings: Contractor, District Representative, Architect, Project superintendent, Major subcontractors and suppliers and others who have an interest in the agenda.

C. Contractor shall prepare and distribute an agenda prior to the meetings; the following topics shall be covered when applicable:

   1. Minutes of previous meeting.

   2. Status of submittals and impending submittals.

   3. Off-site fabrication and delivery schedules.

   4. Review of the actual progress as documented in the Schedule and the 3-week look ahead schedule.

   5. Actual and anticipated delays, their impact on the schedule, and corrective actions taken or proposed.

   6. Progress expected to be made during the next period.

   7. Actual and potential problems.

   8. Develop corrective measures and procedures to regained planned schedule.

   9. Status of corrective work ordered by the District’s Representative.


   11. Requests for Information and Clarifications.
D. Contractor shall record minutes and distribute copies to the Architect and all participants and to all entities affected by decisions made.

1.03 PAYMENT

A. Full compensation for the required meetings shall be considered as included in the contract price paid for the various items of work involved, and no additional compensation shall be allowed therefore.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION
SECTION 01300
SUBMITTALS

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS:

A. The types of submittal requirements specific in this Section include: Shop Drawings, product data, samples, catalog data, equipment and material lists, elementary diagrams, wiring diagrams, installation instructions, maintenance manuals and instructions, operation brochures and miscellaneous work-related submittals. Individual submittal requirements are specified in applicable sections of each unit of work. Refer to other Sections of the specifications and other Contract Documents of this project of administrative submittals.

B. Definitions: Work-related submittals of this Section are categorized for convenience as follows:

C. Shop Drawings: These include specially-prepared technical data for this project, including drawings, diagrams, performance curves, data sheets, schedules, templates, reports, calculations, instructions, measurements and similar information not in standard printed form for general application to a range of similar projects.

D. Product Data: These include standard printed information on materials, products and systems; not specially-prepared for this project, other than the designation of selections from among available choices printed therein.

E. Samples: These include both fabricated and un-fabricated physical examples of materials, products and units of work; both as complete units and as smaller portions of units of work; either for limited visual inspection or (where indicated) for more detailed testing and analysis.

F. Mock-Ups: These are a special form of samples, which are too large or otherwise inconvenient for handling in specified manner for transmittal of sample submittals.

G. Long Lead Items: These may include traffic signal equipment, underground utilities, hardware, lighting fixtures, and HVAC equipment. Submittals for each of these items shall be submitted to Project Manager / Project Engineer and/or the Architect within 30 days after Notice of Award of Contract.

H. Miscellaneous Submittals: Related directly to the work (non-administrative) include warranties, maintenance agreements, workmanship bonds, project photographs, survey data and reports, physical work records, quality testing and certifying reports, copies of industry standards, record drawings, field measurement data, operating and maintenance materials, overrun stock and similar information, devices and materials applicable to the work and not processed as Shop Drawings, product data or samples.

1.02 GENERAL REQUIREMENTS

A. Submittals: Submittals by the Contractor shall include a typewritten list showing each item and manufacturer for approval and review by the Architect. All submittals that include equipment, which form a system or subsystem, shall be submitted simultaneously for coordination purposes. These submittals shall be corrected by the Contractor to “as-built” conditions prior to the completion of the Project and turned over to the Owner.
B. Catalogs: Catalogs for submittals shall have unrelated pages removed, or clearly marked "NOT APPLICABLE", and shall have capacities and specified parameters relating to the item or items clearly marked.

C. Maintenance Manuals and Instructions: Shall indicate routine-type work defined by step-by-step instructions, that should be performed to insure long life and proper operations; the recommended frequency of performance is also to be included. Instructions should include possible trouble spots with diagnosis and correction of each. These manuals shall be submitted to the Owner when the equipment is delivered to the site.

D. Operating Manuals: Shall describe function of each component or subassembly in block-diagram-type presentation to a degree that a mechanic will understand the product well enough to operate and maintain it. These manuals shall be submitted to the Owner when the equipment is delivered to the site.

E. Record Drawings: Contractor shall prepare a set of record prints showing "as-built" installations of products and materials which differ from the Contract Drawings. Marked-up "as-built" prints shall be submitted to the Owner upon completion and acceptance of Project by the Owner, and will be condition of final payment.

F. Submittal Size and Identification: The size of submittal shall be suitable for intended purpose. Minimum size 8-1/2" by 11" drawn to an indicated scale and dimensioned in English (not metric) measurements. Each submittal shall indicate:

1. Name and originating company or firm.
2. Contractor's name.
3. Subcontractor's and supplier's name.
4. Preparation and revision dates.
5. Street sequence number.
7. Description of each enclosure.
9. Reference to any prior actions on the submission.
10. Full identification of materials called out.
11. Statements of reason for any proposed change, proposed adjustment in price and contract time when shop drawings show variations from Contract requirements.

G. Submittal Quantities: Contractor shall provide submittals electronically.

H. Review by the Architect:

1. Submittals stamped "NO EXCEPTION TAKEN", requires no further action by the Architect and fabrication and/or construction may proceed.
2. Submittals stamped "MAKE CORRECTIONS NOTED" requires no further action by the Architect and fabrication and/or construction may proceed contingent upon all corrections being made as noted.
3. Submittals stamped "REJECTED" or "REVISE AND RESUBMIT", requires the Contractor to resubmit them with reasonable promptness and no fabrication or construction may begin.
4. Resubmittals. If first or subsequent submittal is stamped "REJECTED" or "REVISE AND RESUBMIT", corrective action shall be taken and resubmittal procedure shall be same as for first submittal. A resubmittal shall be assigned a new number with reference made to the original submittal number. The Contractor shall direct specific attention in writing or on resubmitted shop drawing to revisions other than the correction requested by the Architect or previous submissions.

a. If more than one resubmittal is required the contractor will be charged for the Architect's time to review any subsequent resubmittals.

J. The Architect will check and review, with reasonable promptness, such drawings and schedules only for conformance with the design concept of the project and compliance with information given in the contract documents. When so directed by the Architect, the Contractor shall make any and all corrections required by the Architect.

1.03 SAMPLES

A. Furnish for review five (5) samples of the various materials, together with the finish thereon, as specified for and intended to be used on or in the work. Samples shall be sent to the office of the Architect, carriage prepaid.

B. Submit all samples for review before purchasing, fabricating, applying, or installing such materials and finishes. The Architect will review or ask for resubmission of samples within 10 days of the Contractor's submission. All reviews will be in writing.

C. The sample shall be assigned a submittal number. A covering letter shall accompany the sample and shall list all items being transmitted, designating their particular usage and location in the project and shall be identified as to manufacturer, trade name, style, model, etc. A Minimum of three reviewed samples shall be returned to the Contractor.

D. Review of a sample shall not be taken in itself to change or modify any contract requirement. All materials, finishes, and workmanship in the complete building shall be equal in every respect to that of the reviewed sample.

E. All samples where applicable shall be 8" x 10" in size and shall be limited in thickness to a minimum consistent with sample analysis. In lieu thereof, the actual full size item shall be submitted.

F. Samples of value may be returned to the Contractor for use in the project after review, analysis, comparison and/or testing as may be required by the Architect.

G. Field samples shall be prepared at the site by the Contractor as specified in the various sections of these Specifications. Affected finished work shall not be commenced until the Architect has given a written approval for the field samples.

1.04 SHOP DRAWINGS

A. The Contractor shall check and verify all field measurements and shall submit for review, with such promptness as to cause no delay in his own work or in that of any other contractor or subcontractor, all shop or setting drawings and schedules required for the work of the various trades.

B. The term "shop drawings" as used herein includes fabrication, erection and installation, layout, and setting drawings, manufacturers' standard drawings, descriptive literature, catalogues and brochures, performance and test data, wiring and control diagrams, all other drawings and
descriptive data pertaining to materials, equipment, piping, duct and conduit systems, methods of construction as may be required to show that the materials, equipment or systems, and the positions thereof conform to the Contract Documents. As used herein, the term "manufactured" applies to standard units’ usually mass-produced; and "fabricated" means items specifically assembled or made out of selected materials to meet individual design requirements.

C. Shop drawings shall establish the actual detail of all manufactured or fabricated items, indicate proper relation of adjoining work, amplify design details of mechanical and electrical equipment in proper relation to physical spaces in the structure, and incorporate minor changes of design or construction to suit actual conditions. Shop drawings shall be drawn to scale and shall be completely dimensioned.

D. The shop drawings and all supporting data, catalogs, etc., shall be prepared by the Contractor or his suppliers and subcontractors, but shall be submitted as the instruments of the Contractor.

E. The Contractor shall check the drawings of his suppliers and subcontractors as well as his own drawings before submitting them to the Architect. In particular, the Contractor shall ascertain that the drawings meet all requirements of the contract drawings and specifications and conform to the structural and space conditions. If such shop drawings show variations from contract documents, whether because of standard shop practice or other reasons, the Contractor shall make special mention thereof in his letter of transmittal.

F. The Architect's review of shop drawings shall be general only and shall not relieve the Contractor from responsibility for errors of any sort, for deviations from drawings or specifications, or for conflict with the work of others that may result from such deviations. Architect's review of a separate item does not indicate a review of an assembly in which the item functions.

1.05 PRODUCT DATA

A. Mark each copy to identify applicable products, models, options and other data; supplement manufacturer's standard data to provide information unique to the work. Include manufacturer's installation instructions when required by the specification section.

1.06 MANUFACTURER'S CERTIFICATES

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

1.07 TEST RESULTS

A. Submit test results, in duplicate, in accordance with requirements of each specification section.

1.08 SUBSTITUTIONS

A. Comply with requirements of Section 01630, for requests for substitutions.

END OF SECTION
SECTION 01352
CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT

PART 1 – GENERAL

1.01 SUMMARY

A. The Contractor shall provide all necessary equipment and material resources required to meet the requirements of this section

1.02 SUBMITTALS

A. The Contractor shall provide the following documentation:

1. Construction Indoor Quality Management Plan:
   a. The Plan shall identify the five SMACNA IAQ requirements for Occupied Buildings under Construction, 1995, Chapter 3.
      1) Part 3.01 of this Section, Indoor Air Quality Plan during Construction, can be used as a basis for development of the plan.
   b. Provide a Draft of the plan prior to the start of building construction.
   c. Provide a Final version of the Construction IAQ Management Plan after completing the requirements of this section.

2. Filtration Media Product Data:
   a. Provide cut sheets for filtration media installed:
      1) During Construction.
      2) During the flush out.
      3) After the flush out and prior to occupancy.
      4) The cut sheets shall highlight the MERV values of the media.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 INDOOR AIR QUALITY MANAGEMENT DURING CONSTRUCTION:

A. During construction the Contractor shall meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Association (SMACNA), IAQ Guidelines for Occupied Buildings under Construction, 2008, Chapters 3 and 4, for the items listed below. The SMACNA guidelines have been modified to address the special issues and needs of a new construction project:
B. HVAC Protection:
   1. Protect all air handling and distribution equipment, and air supply and return ducting during construction.
   2. Adequately cover and protect all exposed air inlets and outlets openings, grilles, plenums, etc. to prevent water, moisture, dust, and other contaminate intrusion.
   3. Apply protection immediately after installation of equipment and ducting.
   4. Ducting runs that require more than a single day to install shall be protected at the end of each day's Work.
   5. Install air filters with a MERV filtration value of 8, as determined by ASHRAE 52-2-1999, over all air return grilles.

C. Source Control:
   1. Protect stored on-site or installed absorptive or porous materials such as batt insulation and drywall from exposure to moisture.
   2. Do not use wet damaged porous materials in the building.
   3. Provide adequate ventilation of packaged dry products prior to installation. Remove from packaging and ventilate in a secure, dry, well-ventilated space free from strong contaminant sources and residues.
   4. Provide a temperature range of 60 degrees F minimum to 90 degrees F maximum continuously during the ventilation period. Do not ventilate within limits of Work unless otherwise approved by the Architect.
   5. Route material deliveries and construction waste removal around the exterior of the building, not through it.

D. Housekeeping:
   1. Minimize accumulation of dust fumes, vapors, or gases in the building.
   2. Suppress dust with wetting agents or sweeping compounds.
   3. Clean-up dust using a wet rag or damp mop.
   4. Increase the cleaning frequency when dust build-up is noted.
   5. Remove spills or excess applications of solvent-containing products as soon as possible.
   6. Remove accumulated water and keep work areas as dry as possible.
   7. Vacuum using HEPA filtered vacuum cleaners.
   8. Store volatile liquids, including fuels and solvents, in closed containers and outside of the building when not in use.
   9. Keep volatile liquid containers closed when the container is inside of the building and not in
F. Scheduling:

1. Schedule for application of interior finishes including time frames for the application of wet materials onto dry materials, dry materials onto wet materials, and expected curing times for applied wet materials.

2. Wet materials include all paints, adhesives, sealants, coatings, finishes, and spray-applied materials, such as structural fireproofing.

3. Insure that all wet applied interior finish materials are properly and fully cured before installing other finish materials over them.

4. Install carpets and furnishings after all of the interior finish materials have been applied and fully cured.

5. Provide sufficient ventilation, air circulation and air changes to properly cure materials.

6. Provide sufficient ventilation, air circulation and air changes to dissipate excessive humidity when present.

END OF SECTION
SECTION 01450
ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section establishes general requirements pertaining to abatement and control of environmental pollution arising from activities of the Contractor and his subcontractor or subcontractors in performance of the Work of the Contract.

1. The Contractor is required to implement Best Management Practices (BMP’s) during construction and prevent pollution to the storm water conveyance system. Also, adjacent storm drain inlets shall be protected at all times during the construction of the improvements.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions and other Sections in Division 1 of these Specifications.

2. Additional requirements may be stated in various other Sections of the Specifications.

C. Definitions:

1. The term "environmental pollution," as used in this Section, means:

   a. The presence of chemical, physical, or biological elements or agents which:

      1) Adversely affect human health and/or welfare;

      2) Unfavorably alter ecological balances that are of importance to human life;

      3) Affect other species of importance to man;

      4) Degrade the utility of the environment for aesthetic and/or recreational purposes;

   b. The control of environmental pollution requires consideration of air, water and land, and involves noise, solid waste-management, and management of radiant energy and radioactive materials, as well as other pollutants.

2. Contaminants:

   a. "Sediment" means soil and other debris that have been eroded and transported by runoff water.

   b. "Solid waste" means rubbish, debris, garbage, and other discarded solid materials resulting from construction activities, including a variety of combustible and noncombustible wastes such as ashes, waste materials resulting from construction or maintenance and repair work, leaves, and tree trimmings.

   c. "Chemical waste" includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, disinfectants, organic chemicals, and inorganic wastes; some of which may be classified as "hazardous."
d. "Sanitary wastes":

1) "Sewage" means that which is considered as domestic sanitary sewage;

2) "Garbage" means refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

e. "Hazardous materials" means such materials as are so defined by applicable laws and regulations.

1.02 SUBMITTALS

A. Comply with pertinent provisions of Section 01300.

B. Prior to commencement of the Work of this Contract:

1. Compile and submit to the Architect a written environmental protection program proposed by the Contractor for compliance with the requirements of this Section.

2. Meet with the Architect to review the proposed environmental protection program and to make any changes in the plan, as required by the Architect, prior to commencement of the Work.

3. Prior to commencement of the Work, secure the Architect's approval of the written environmental protection program.

1.03 QUALITY CONTROL

A. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

B. Comply with all pertinent Federal, State, and local regulations pertaining to water, air, solid waste, and noise pollution.

C. Require subcontractors to comply with the provisions of this Section.

1.04 PAYMENT

A. Full compensation for making said provisions shall be considered as included in the contract price paid for the various items of work involved, and no additional compensation shall be allowed therefore.

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

A. Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise over 85 decibels at 100 feet.
3.01 PROTECTION OF NATURAL RESOURCES

A. It is intended that the land resources within boundaries of the Project, but outside the limits of permanent Work performed under this Contract, shall be preserved in their present condition or be restored to a condition after completion of construction that will appear to be natural and not detract from the appearance of the Project.

1. Areas outside the project boundary are to be considered environmentally sensitive lands. No impact on these areas will be permitted, including disposing of construction materials, grading operations, storage or vehicles and equipment, access to other areas of the site or any other activity connected to the project.

B. Insofar as possible, Contractor shall confine activities to pertinent areas defined on the Drawings or elsewhere in the Contract Documents.

1. Return construction areas to their pre-construction elevations except where surface elevations are otherwise noted to be changed.


3. Conduct construction activities in such a manner that pooling of stagnant water will not occur at any time.

C. Land resources:

1. Do not remove, cut, deface, injure, or destroy trees or other vegetation outside the limits of the Work.

2. Do not remove, cut, deface, injure, or destroy trees or other vegetation inside the work area limits except as allowed in writing by the Architect.

3. Land resources damaged by the Contractor shall be promptly replaced or repaired to the approval of the District and at the Contractor's expense.

D. Do not allow the depositing of mud and debris from construction vehicles onto public streets; sweep turning areas and pavement entrances as needed to remove any and all spills or material tracked onto the public street.

E. Water resources:

1. Reference General Conditions regarding compliance with State Storm Water permit for Construction. Prevent oily or other hazardous substances from entering the ground, drainage areas, or other bodies of water in such quantities as to affect aesthetics or normal use or to produce a measurable impact upon the area.

2. In accordance with applicable regulations, gather and dispose of soil or water which is contaminated with oily substance due to the Contractor's operations.

3. De-chlorinate chlorinated water prior to discharge, and do not permit chlorinated water to enter the ground or surface waters.

4. Do not pump ground water into natural surface water channels or in any other manner permit ground water to enter natural surface water.
F. Noise control:
   1. Do not permit noise levels exceeding the following:
      a. Trenchers, pavers, graders, and trucks: 85 dba at 100 feet as measured under the noisiest operating conditions;
      b. All other equipment: 85 dba at 50 feet.
      c. Use "whisperized" type generators as approved by the Architect.
   2. Jack hammers:
      a. Equip with exhaust mufflers and steel muffling sleeves;
      b. Use "whisperized" type air compressors as approved by the Architect.
   3. Operations:
      a. Keep noisy equipment as far as possible from noise-sensitive site boundaries;
      b. Do not leave machines idling;
      c. Use electric power in lieu of internal combustion engine power when practicable;
      d. Do not leave equipment on when unattended.
      e. Maintain equipment in a manner to reduce noise from excessive vibration, faulty mufflers, and similar sources;
      f. Provide mufflers on all engines;
      g. Schedule operations to minimize their duration at any given location.
   4. Monitoring:
      a. As needed, provide portable sound metering devices meeting requirements of ANSI S1.4 for Type 2 sound level meters.
      b. Promptly locate and correct non-complying noise levels.

3.02 BURNING RUBBISH AND DEBRIS
   A. Open burning of rubbish, debris, and/or other combustibles will not be permitted on the site.

3.03 DUST CONTROL
   A. Provide within the proposed plan for environment protection an acceptable program to prevent generation of dust due to operation under this Contract. This includes dust in the buildings.

3.04 COMPLIANCE
   A. The Architect will notify the Contractor in writing of any noncompliance with the provisions of this Section, and will describe actions to be taken.
   1. Such notice, when delivered to the Contractor or his authorized representative at the job
site, will be deemed sufficient for the purpose.

2. Immediately upon receipt of such notice, initiate the required action or actions.

B. Noncompliance:

1. If the Contractor fails or refuses to comply promptly, the Architect may issue an order stopping all or part of the Work of this Contract until satisfactory corrective action has been taken.

2. No part of the time lost due to any such Stop Orders shall be made the subject of a Claim for extension of time or for excess costs or damages by the Contractor.

END OF SECTION
SECTION 01500
CONSTRUCTION FACILITIES

PART 1 - GENERAL

1.01 DESCRIPTION:

A. Work included: Furnish all materials and labor to provide temporary facilities and controls during construction for all trades.

B. Job Conditions: Temporary facilities and construction processes and techniques employed on this project shall be in strict compliance with all applicable codes.

1.02 QUALITY ASSURANCE

A. Regulations: Comply with requirements of local laws and regulations governing construction and local industry standards, in installation and maintenance of temporary services and facilities.

1. Building Codes, including local requirements for permits, testing and inspection.

2. Local and county health and safety regulations.

3. Regulations and recommendations governing temporary utility services.


5. EPA regulations governing use of water and energy, and the control of dust, noise and other nuisances.

6. Requirements of the Regional Water Quality Board.

7. Code of Regulations that regulates environmental quality as outlined in Title 22 CCR.

8. OSHA Construction Safety Orders.


1. Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", prepared jointly by AGC and ASC, for industry recommendations.

2. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service in compliance with National Electric Code (NFPA 70).

3. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.05 PROJECT CONDITIONS

A. Conditions of Use: Keep temporary services and facilities clean and neat in appearance.
Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on the site.

1.06 TEMPORARY CONSTRUCTION SERVICES

A. Make all necessary arrangements for, and provide, extend, and maintain temporary utility and construction services as described and as necessary for the work of all trades and workmen employed on the project, until completion and acceptance of the project by the City, or until no longer required. When no longer required, discontinue services and remove all related materials.

1.07 RUNWAYS, LADDERS, SCAFFOLDS AND TEMPORARY STAIRS

A. Provide and maintain runways, ladders, scaffolds and temporary stairs to provide access to the work for the use of all trades.

B. Provide all temporary means of access in accordance with the "Manual of Accident Prevention in Construction" of the Associated Prime Contractors of America and with applicable Federal, State, and Local Safety Regulations.

PART 2 - PRODUCTS

2.01 FACILITIES:

A. Construction Fence and Yard Storage: Contractor will be responsible for all security controls on the project.


B. Contractor's Job Office: Contractor shall coordinate with Architect for location of trailer if needed. No additional space within the station shall be provided for contractor's use

C. Sanitary Facilities: Provide suitable chemical type toilets maintained in sanitary condition as approved by the Health Department. Toilets shall be removed, complete with contents upon completion of the project. All existing sanitary facilities within the building shall not be used under any circumstances.

D. Portable Fire Extinguishers: As minimum requirement, provide one (1) standard UL listed multi-purpose dry chemical fire extinguisher with a minimum rating of 3A-60BC for each 3000 square feet of new floor space or fraction thereof and one at each tool house, temporary office, paint storage room or workshop on the premises.

1. In lieu of the above, one (1) standard 2-1/2 gallon water and one (1) 10BC rated CO2 type extinguisher, mounted as a pair, may be used for the same areas.

2. The extinguishers provided should be capable of extinguishing any type of small fire and be so labeled or marked that the proper extinguisher would be used on a particular type of fire.

3 Instruction of workmen in the proper use of extinguishers is required.
4. Mount extinguishers on red-painted portable wooden stands no more than 150 feet apart.

5. Post local fire department call number on each telephone instrument at project site.

E. Enclosures: Provide temporary weather-tight closures of openings in exterior surfaces to provide acceptable working conditions and protection for materials, to allow for temporary heating, and to prevent entry of unauthorized persons. Building security must be maintained at all times.

F. Barricades: Construct and maintain fences, planking, barricades, lights, shoring, and warning signs as indicated on the drawings and as required by local authorities and state safety ordinances and as required to protect the City’s property from injury or loss and as necessary for the protection of the public, and provide walks around obstructions made in a public place for carrying on the work covered in this contract. Provide temporary construction fencing to protect work site from unsupervised public access at all times, without exception. Leave protection in place and maintain in good condition until removal is authorized.

G. Shoring, Anchoring, Bracing: Provide temporary shoring, anchoring and bracing required by the nature of the work in order to make all parts absolutely rigid and stable. The Contractor shall be responsible for any damage resulting from failure to provide either through lack of proper judgment or from any other cause.

H. Storage Sheds for Tools, Materials, and Equipment: Contractor may provide weather-tight, with adequate space for organized storage and access, and lighting for inspection of stored materials.

2.02 TEMPORARY LIGHT AND POWER:

A. The Contractor shall be allowed use of existing utilities during the course of construction. Furnish power and light to each trade as necessary to perform the work.

B. Install circuit and branch wiring, with area distribution boxes located so that power and lighting is available throughout the construction by use of construction-type power cords.

1. The minimum requirements for the system consist of lighting required for construction needs, safe and adequate working conditions, public safety, security lighting and lighting for temporary office, storage and construction buildings.

2. Provide all equipment, including connections and other materials necessary for extending the existing utility lines to where they will be used. Coordinate the installation with the Architect.

3. Provide light levels complying with safety regulations and codes. Provide 20 foot candles minimum inside building and 5 foot candles outside and along perimeter of site.

4. Temporary electrical power for construction shall comply with applicable NEMA, NECA, and UL Standards safety regulations and codes; temporary power shall have automatic ground fault feature and there shall be not less than one power center per floor for miscellaneous tools and equipment, located so that power is available at any desired point with no more than 100 ft. extension cords; weatherproof distribution boxes with minimum of four 20A, 120V, grounded outlets, circuit breaker protection for each outlet, and equipment grounding continuity for entire system shall be provided. Grounded UL extension cords shall be used from power centers to point of operation.
5. Ground-Fault Protection: Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button and pilot light, for plug-in connection of power tools and equipment.

C. Remove temporary wiring and equipment when no longer needed and dispose of equipment and wiring. Repair holes left in paving, walls and partitions.

2.03. TEMPORARY HEATING, COOLING AND VENTILATION:

A. General: Portable devices will be necessary whenever heating or ventilating is required, such use and equipment used shall comply with requirements specified herein.

1. Heaters shall be NFPA approved and Underwriters Laboratories listed and approved by the Architect.

2. The Contractor shall pay cost of fuel used.

3. Provide temporary heat and ventilation as required to maintain adequate environmental conditions to facilitate progress of the work to meet specified minimum conditions including manufacturer's minimum recommended temperatures for the installation of materials, and to protect materials and finishes from damage due to temperatures or humidity. In no case shall temperature within building be less than 50 degrees F.

4. Provide adequate forced ventilation of enclosed areas for curing of installed materials to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors and gases.

B. Unless specified otherwise in the Specification of this Contract, the Contractor shall:

1. Provide heat as necessary to protect all work, materials, and equipment against injury from dampness and cold.

2. Protect, cover and/or heat as may be necessary, to produce and maintain a temperature of not less than 50 degrees F., (1) in the concrete during the placing, setting and curing of concrete, and (2) in the plaster during the application, setting and curing of plaster.

3. Provide heat as necessary in the area where work is to be done to provide the minimum temperature recommended by the supplier or manufacturer of the material, but in no case less than 50 degrees F., for a period beginning ten (10) days before placing of interior finishes and finish materials and continuing until completion or beneficial occupancy of the area, whichever is earlier.

C. Prior to and during plastering and drywall application, setting and curing thereof, provide sufficient heat to maintain building temperature of not less than 55 degrees F. while maintaining adequate ventilation for drying of plaster.

D. Before casework is delivered to the building and prior to installing wood finish, and throughout placing of this finish and other finishing operations such as painting and laying of resilient floor covering, provide sufficient heat to maintain building temperature at 65 degrees F.

E. Temporary Ventilation: Provide ventilation to prevent hazardous accumulations of dusts, fumes, mists, vapors or gases in areas occupied during construction.
F. Provide local exhaust ventilation to prevent harmful dispersal of hazardous substances into atmosphere of occupied areas.

G. Dispose of exhaust materials in manner that will not result in harmful exposure to persons.

H. Ventilate storage spaces containing hazardous or volatile materials.

2.04 CONSTRUCTION EQUIPMENT

A. Contractor shall erect, equip, and maintain all construction equipment in strict accordance with all applicable statutes, laws, ordinances, rules and regulations of authority having jurisdictions.

B. Contractor shall provide, maintain and remove upon completion of the work all temporary rigging scaffolding, hoisting equipment, barricades and all other equipment required for all work hereunder.

C. Construction equipment shall conform to all the requirements of State, County, and local authorities and underwriters which pertain to operation, safety, and fire hazard.

2.05 STORAGE

A. Operations of the Contractor, including storage of materials, shall be confined to on-site areas approved by the Architect. Contractor shall be liable for damage caused by him during such use of property of the City or other parties. Contractor shall save the District, its officers and agents, and employees free and harmless from liability of any nature or kind arising from any use, trespass, or damage occasioned by his operations on premises of third persons.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS:

A. Provide all facilities and controls, of substantial construction, as required to serve intended purpose during full life of construction or for full extent of need during construction, and as approved by the Architect. Maintenance, operation, and control of all new or temporary electrical or mechanical facilities put into operation before final acceptance of project will complete responsibility of Contractor until final acceptance.

3.02 GRADES, LINES AND LEVELS:

A. All dimensions show for existing site conditions and all dimensions required for work of this Contract that is to be performed shall be verifies by the Contractor by actual measurement of the existing conditions. Any discrepancies between the Contract requirements and the existing conditions shall be referred to the Architect before any work affected thereby has been performed.

3.03 REMOVAL:

A. As facilities and controls are no longer needed to serve original purpose, they shall be completely removed from site and all debris cleaned up and removed. At end of the Contract, and prior to final acceptance, no evidence of temporary facilities or Contractor’s operations shall remain.

B. Clean and repair damage caused by installation or use of temporary facilities.
3.04 CLEANING DURING CONSTRUCTION

A. Cleaning shall be in accordance with Section 01720, "Cleaning".

END OF SECTION
SECTION 01524
CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section specifies the administrative and procedural requirements for diversion of non-hazardous construction and demolition waste from landfill.

1.2 PERFORMANCE REQUIREMENT

A. Performance Requirement: It is a requirement of this Project that a minimum of 75 percent (by weight) of non-hazardous construction and demolition debris be diverted from the landfill.

1.3 DEFINITIONS

A. Construction Waste: Building improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging materials such as cardboard.

B. Demolition Waste: Building improvement materials resulting from selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

G. Recyclable Materials:

1. Products and materials that can be recycled may include, but are not limited to, the following:

a. Metals (ferrous and non-ferrous), including banding, metal studs, ductwork, aluminum cans, and piping.

b. Gypsum board.

c. Paper.

d. Cardboard.

e. Wood products, including crates and pallets.
f. Carpet.
g. Plastics.
h. Copper wiring.
i. Mechanical and electrical products and equipment.

2. Final determination of actual recyclable materials will be based on the local recycling facility capability.

1.4 SUBMITTALS

A. Waste Management Plan: Submit plan within 7 days of date established for the Notice to Proceed.

B. Waste Reduction Calculations: Before request for Substantial Completion, submit copies of calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.

C. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices. If a construction and demolition recycling facility is used, include signed letters from the facility indicating the weight or volume of the material sent to the facility, as well as the state approved monthly diversion rates for that facility.

D. Submit other records, including records of sales and donations, as applicable and required to substantiate conformance with waste management goals.

1.5 WASTE MANAGEMENT GOALS

A. General: Develop waste management plan that results in end-of-Project rates for salvage/recycling of 75 percent by weight of total waste generated by the Work, at a minimum.

B. The Contractor shall take a proactive and responsible role in the management of construction waste, and shall require all subcontractors, vendors, and suppliers to participate in the effort.

C. The Contractor shall establish a construction waste management program for this Project that includes, but is not limited to, the following:

1. Salvage and reuse.
2. Salvage for resale.
4. Disposal.

D. Only trash or waste materials that cannot be practically or economically reused or recycled shall be transported to the landfill.
1.6 WASTE MANAGEMENT PLAN

A. General: Develop plan consisting of waste identification and waste reduction work plan. Indicate quantities by weight or volume, but use same units of measure throughout Waste Management Plan.

B. Identify the off-site Recycling Service and Hauler of each designated debris item, who have agreed to accept and divert that item from landfill, and the proposed quantities. Schedule each item and list off-site Recycling Service and Hauler company name, telephone number, address, and person contacted.

C. Waste Identification: Indicate anticipated types and quantities of demolition and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

1.7 PLAN IMPLEMENTATION

A. Maintain a log of each load, of each category item diverted from landfill. Log in separately debris sent to a Class III and/or Class II landfills and materials sent to recycling facilities.

1. Include in log, type of load, load weight, name of hauling service; recycling service or landfill, and date accepted by recycling service or by landfill.

2. Owner reserves the right to audit the log at any time, retain and make available, all weight tickets, copies of receipts and invoices.

3. Submit a Monthly Construction Waste Management Report with each Application for Payment. Monthly reports shall indicate all material removed from the project, and it’s eventual disposition, recycling or landfill. Provide weights for all materials and percentages of total waste recycled.

B. Material Handling:

1. Separation Facilities:

   a. Designate a specific on site area or areas to facilitate separation of materials for potential salvage or reuse, recycling, and return.

   b. Keep waste bins and pile areas neat and clean. Clearly mark bins for each category of waste. Do not mix non-recyclable waste with materials designated for reuse or recycling.

2. Do not permit designated materials to become contaminated or to contaminate site or surrounding areas.

3. Construction and demolition recycling facilities are an acceptable means of landfill diversion. If such a facility is utilized, monthly diversion records for the construction and demolition recycling facility and a letter from the facility identifying weights or volumes of material processed by the facility for the Project must be submitted.

C. Training And Coordination:

1. Furnish copies of the Waste Management Plan to all on-site supervisors and each subcontractor.
2. Provide on-site instruction of appropriate separation, handling, and recycling, salvage or reuse, and return methods to be used by all entities at the appropriate stages of the Project.

3. Include construction and demolition debris management on the agenda of meetings. At a minimum, discuss waste management goals and issues at the following meetings:
   
a. Pre-construction meeting.

b. Regularly scheduled job-site meetings.

END OF SECTION
SECTION 01600
MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 PRODUCTS

A. Products include materials, equipment, and systems.

B. Comply with Specifications and referenced standards as minimum requirements.

C. Components required to be supplied in quantity within a Specification section shall be the same, and shall be interchangeable.

1.02 WORKMANSHIP

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

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

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

1.03 MANUFACTURER'S INSTRUCTION

A. When work is specified to comply with manufacturer's instructions, submit copies as specified in Section 01300, distribute copies to persons involved, and maintain one set in field office.

B. Perform work in accordance with details of instructions and specified requirements. Should a conflict exist between Specifications and instructions, consult with Quality Control Manager and/or the Architect.

1.04 TRANSPORTATION AND HANDLING

A. Transport Products by methods to avoid product damage; deliver in undamaged condition in manufacturer's unopened container or packaging.

B. Provide equipment and personnel to handle Products by methods to prevent soiling or damage.

C. Promptly inspect shipments to assure that Products comply with requirements, quantities are included, and Products are undamaged.

1.05 STORAGE AND PROTECTION

A. Store Products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive Products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.

B. For exterior storage of fabricated Products, place on sloped supports above ground. Cover Products subject to deterioration with impervious sheet covering; provide ventilation to
avoid condensation.

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

D. Arrange storage to provide access for inspection. Periodically inspect to assure Products are undamaged, and are maintained under required conditions.

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

END OF SECTION
SECTION 01630

SUBSTITUTIONS AND PRODUCT OPTIONS

PART 1 - GENERAL

1.01 PRODUCT OPTIONS

A. For products specified only by reference standard, select product meeting that standard, by any manufacturer.

B. For products specified by naming three or more products or manufacturers, it is intended that the specified products of those manufacturers shall be furnished.

C. For products specified by naming one or more products or manufacturers and stating "or other approved", or "or approved equal", or other such wording on Drawings or within Specifications Sections, it is intended that the products by Acceptable Manufacturer’s, which in the opinion of the Architect are equivalent to the specified product, specified by product number, may be furnished.

1. Submit a request for substitutions for any product or manufacturer which is not specifically named, but only after submitting bid on specified products and systems.

2. Use attached Substitution Request Form.

D. For products specified by naming one or more products or manufacturers and stating "no substitution", it is intended that the specified product of that Manufacturer shall be furnished.

1.02 SUBSTITUTIONS

A. It is the intent of the Architect to have this project constructed with materials, products and systems originally designed and specified into project. This opportunity to request substitutions is not for the convenience of bidders or contractors to submit bids for materials, products and systems which may be more familiar to them, or having a lesser cost.

1. If, in the opinion of the Architect, a product is deemed an acceptable alternative, any potential cost savings recognized by the contractor shall be passed back to the Owner.

C. The burden of substantiating the equivalency of a substitution option rests solely with the Contractor. Time spent by the Architect researching the adequacy of such substitutions will be charged to the Contractor.

D. Submit separate request for each substitution. Support each request with an explanation for request, and include:

1. Complete data substantiating compliance of proposed substitutions with requirements stated in Contract Documents:
   a. Product identification, including manufacturer's name and address.
   b. Manufacturer's literature; identify:
      1) Product description.
      2) Reference standards.
3) Performance and test data.
   c. Samples, as applicable.
   d. Name and address of similar projects on which product has been used, and date of each installation, as well as servicing agency and installer.

2. Itemized comparison of the proposed substitution with products specified, listing significant variations.

3. Data relating to changes in the construction schedule.

4. Any effect of substitution on separate contracts.

5. Any effect of substitution on in-place construction, or other materials and systems to be installed.

6. Accurate cost data comparing proposed substitution with product specified.

7. Designation of required license fees or royalties.


E. Substitutions will not be considered for acceptance when:
   1. Lesser material cost is the sole reason for request.
   2. They are indicated or implied on shop drawings or product data submittals without formal request.
   3. Acceptance may require revision of Contract Documents.

F. Substitute products shall not be ordered or installed without written acceptance and authorization of Project Manager / Project Engineer and/or the Architect.

G. Only the Architect will determine the acceptability of proposed substitutions.

1.03 REPRESENTATIONS

A. In making a legitimate, authorized formal request for substitution, represent that:
   1. A thorough investigation has transpired concerning the proposed product, and it has been determined that it is equal to or superior in all respects to that specified.
   2. The same warranties or bonds, and guarantees will be provided as for that specified.
   3. Installation of the accepted substitution will be coordinated into the work; and such changes to in-place work, ordered materials and products, or other work to be in progress prior to installation of the requested substitutions, will be performed without any additional cost to Owner.

1.04 DUTIES
A. Requests for substitutions must be expeditiously forwarded for consideration.

B. Notification of decisions concerning acceptance or rejection will be in writing, and are final without need for clarification.
SUBSTITUTION REQUEST FORM
Failure to complete this form with information required will nullify any request for substitution.

TO: ________________________________________________________________

PROJECT: San Ramon Fire Station 34 Remodel

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

SECTION PARAGRAPH SPECIFIED ITEM

________________ __________ __________________________

Proposed Substitution: ____________________________________________

Attach complete technical data, including laboratory test, if applicable.

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

Submit with request all necessary samples and substantiating data to prove equal quality and performance to that which is specified. Clearly mark manufacturer's literature to indicate equality in performance.

Fill in Blanks Below:

A. Does the substitution affect dimensions shown on Drawings?
   Yes ____  No _____. If yes, clearly indicate changes.

B. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution?

C. What affect does substitution have on other trades? _________

D. What affect does substitution have on applicable code requirements?

E. Differences between proposed substitution and specified item?

F. Manufacturer's guarantees of the proposed and specified items are: _____Same _____Different (explain on attachment)

G. ICBO Number of proposed substitution: ________________.

*****************************************************************
For Use by Design Consultant
____Accepted                        ____Accepted as Noted

San Ramon Fire Protection District
Fire Station 34 Remodel
San Ramon, California
CERTIFICATION OF EQUAL PERFORMANCE AND ASSUMPTION OF LIABILITY FOR EQUAL PERFORMANCE

The undersigned states that the function, appearance and quality are equivalent or superior to the specified time.

Submitted By:

_________________________________  By___________________________
Signature            Title

_________________________________  Date _________________________
Firm

_________________________________  Remarks ______________________
Address

_________________________________  Telephone            Date  ______________________

Signature must be by person having authority to legally bind his firm to the above terms. Failure to provide legally binding signature will result in retraction of approval.

END OF SECTION
SECTION 01700
CONSTRUCTION PROCEDURES

1.01 DEFINITIONS

A. Concealed Spaces: Spaces which are not accessible after completion of construction.

B. Cutting: Removal of material by cutting, sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation.

C. Damage: Any sort of deterioration whether due to weather, normal wear and tear, accident, or abuse, resulting in soiling, marring, breakage, corrosion, rotting, or impairment of function.

D. Debris: Rubbish, waste materials, litter, volatile wastes, and similar materials, with the exception of surplus materials which are to become the property of the Owner.

E. Operational Elements: Equipment, moving parts, electrical conductors, sound and vibration control materials, waterproofing, vapor retarders, piping, ducts, tanks, and other similar materials and components which convey or retard the passage of liquids, gases, heat, light, persons, animals, or insects or which perform a similar function; not including structural elements.

F. Patching: Restoration to completed condition by patching, repairing, finishing, filling, closing up, and similar operations.

G. Replacement: Replace the entire element, surface, or product.

1.02 SUBMITTALS

A. Proposals for Cutting and Patching: Submit request 10 working days in advance of the time the work is to be performed to obtain approval; include:

1. Description of the nature of the work and how it is to be performed, including reasons why cutting cannot be avoided.

2. Description of results expected, including impact on safety and on structural, operational, and visual qualities.

3. If utilities are affected, describe the changes required and be specific as to how long service will be cut off.

4. If cutting of structural work results in the need for additional reinforcement, provide details and engineering calculations to show how that reinforcement satisfies the original structural requirements.

5. Submit product data for materials proposed for patching.

B. Startup Reports: Include a statement that the item has been installed properly and is functioning correctly. Include the following information:

i) Item started up.

ii) Date of startup operation.

iii) Entity performing startup.

iv) Applicable specification section.

v) Results of startup.
vi) Signature of person performing startup.

C. Field Correction Requests: Submit immediately upon discovery of deviation required; include a detailed description of the problem, recommended changes, and reasons it is not possible to comply with the Contract Documents.

D. Certificate from surveyor stating that the construction has been placed in the locations and at the elevations required by the Contract Documents.

1.03 PROJECT CONDITIONS

A. Take precautions to prevent fires and to facilitate fire-fighting operations.

1. Keep flammable materials in non-combustible containers; store away from potential fire sources; remove flammable waste regularly.

2. Keep temporary and permanent fire fighting facilities readily accessible; keep fire fighting routes open.

3. Do not allow smoking in areas where highly combustible or explosive materials are present.

4. Carefully supervise the operation of potential fire sources, including heating units.

5. Conduct welding operations in manner to prevent fire; comply with local regulations.

B. Take precautions to prevent accidents due to physical hazards:

1. Provide barricades, warning lights, or signs as required to inform personnel and the public of the hazard being protected against.

2. Safety barricades: Comply with regulations.

3. Provide temporary walkways where walking surfaces are hazardous.

4. Provide construction fencing to secure entire site area.

C. Take care to prevent pollution of air, water, and soil. Comply with environmental protection regulations.

1. The Contractor shall comply with all applicable standards, orders or requirements of the Clean Air Act of 1970, including but not limited to Section 306 (42 U.S.C. 7606), Executive Order 11738, prohibiting contracting with Clean Air Act violators; and Sections 608 and 609 (42 U.S.C. 7671g. 7671h) as amended November 15, 1990, prohibiting the intentional release of chlorofluorocarbons into the environment when performing work specified by the contract.

2. The Contractor shall comply with all applicable standards, orders, or requirements issued under Section 508 of the Clean Air Act (33 U.S.C 1368) Executive Order 11738.

3. The Contractor shall exercise extreme care when excavating adjacent to existing utilities. The Contractor shall include in his bid all labor and materials necessary to protect existing utilities. If no pay item is provided in the contract for this work, full compensation for such work shall be considered as included in the prices bid for other items of work.
4. The Contractor shall comply with all applicable standards, orders or requirements of the Base regarding "Stormwater Management and Discharge Control", prohibiting the discharge of non-stormwater to a stormwater conveyance system.

5. The Contractor shall comply with all applicable standards, orders, or requirements of the Environmental Protection Agency regulations (40 CFR, Part 15).

6. The Contractor shall comply with all applicable standards, orders, or requirements of the Flood Disaster Protection Act of 1973 (42 USC 4001 et seq, as amended).

D. Prevent erosion due to rainwater runoff.

E. Control windblown dust; prevent nuisance to Owner’s personnel and visitors.

F. Prevent flooding of excavations, below-grade construction, and adjacent areas due to rainwater runoff.

G. Do not use tools or equipment which produce harmful levels of noise.

1. Minimize the use of noise-making tools and equipment during hours that adjacent areas are in use.

H. Keep the site and adjacent public ways free of hazardous and unsanitary conditions and public nuisances.

I. Control rodents and other pests.

J. Keep adjacent areas free of debris due to this work.

K. Provide adequate traffic control by means of signs, signals, and flagmen, as necessary.

L. Provide temporary means of draining roofs where required.

M. Conduct construction operations so that no part of the work is subjected to damaging operations or influences which are in excess of those to be expected during normal occupancy conditions.

N. Conduct construction operations so that waste of power, water, and fuel is avoided.

O. Provide temporary supports as required to prevent movement and structural failure.

P. Install products only during environmental conditions which will ensure the best possible results.

Q. During the progress of the work, the Contractor shall keep the site of the work and other areas used by it in a neat and clean condition, and free from any accumulation of rubbish. The Contractor shall dispose of all rubbish and waste materials of any nature occurring at the work site, and shall establish regular intervals of collection and disposal of such materials and waste. The contractor shall also keep its haul roads free from dirt, rubbish, and unnecessary obstructions resulting from its operations. Equipment and material storage shall be confined to areas approved by the Project Manager / Project Engineer. Disposal of all rubbish and surplus materials shall be off the site of construction, at the Contractor’s expense, and in accordance with local codes and ordinances governing locations and methods of disposal.
and in conformance with all applicable safety laws, and to the particular requirements of subpart H, Section 1926.252 of the OSHA Safety and Health Standards for Construction.

1.04 ILLNESS AND INJURY PREVENTION PROGRAM:
A. The Contractor shall comply with all the mandates of Senate Bill 198 and specifically shall have a written Injury Prevention Program in accordance with all applicable standards. This Program shall be on file at time of Notice of Award of Contract.

1.05 GRAFFITI CONTROL:
A. The Contractor shall maintain all site improvements, including any temporary facilities, equipment or other materials in a graffiti free condition throughout the construction period, until acceptance of the project by the Owner. Graffiti encountered on the job site shall be removed by the Contractor within twenty-four (24) hours.

1.06 SEQUENCING AND SCHEDULING
A. Install products only at the time and in the sequence which will ensure the best possible results.
B. Coordinate required administrative activities with related construction activities.

PART 2 - PRODUCTS

2.01 MATERIALS
A. Patching Materials: Identical to the materials of the work to be cut, unless indicated as specific materials specified in other sections.

PART 3 - EXECUTION

3.01 GENERAL EXAMINATION REQUIREMENTS
A. Prior to performing work, examine the applicable substrates and the conditions under which the work is to be performed.
B. If unsafe or otherwise unsatisfactory conditions are encountered, take corrective action before proceeding.
C. Conditions which could have been discovered by examination will not be allowed as cause for claims for extra work.
D. The existence and location of construction indicated as existing on the drawings are not guaranteed. In particular, verify the following:
   1. Underground utilities.
      (1) Other underground construction.
      (2) Location and invert elevation of points of connection to piped utilities.
E. Verify that utility requirements of operating equipment are compatible with building utilities.
F. Verify space requirements of items which are shown diagrammatically on the drawings.

3.02 GENERAL PREPARATION REQUIREMENTS

A. Take field measurements as required to fit the work properly.
B. Recheck measurements prior to installing each product.

3.03 GENERAL INSTALLATION PROCEDURES

A. Accurately locate the work and components of the work; make vertical work plumb; make horizontal work level.

B. See sections describing specific parts of the work for additional requirements.

C. Where space is limited, install components to maximize space available for maintenance and to maximize ease of removal for replacement.

D. In finished areas, conceal pipes, ducts, and wiring within the construction, unless otherwise indicated.

E. Coordinate exact locations of fixtures and outlets with finish elements.

F. Install work in such a manner and sequence as to preclude, if possible, or at least to minimize, cutting and patching.
   1. Do not cut any operational elements.

3.04 CUTTING AND PATCHING PROCEDURES

A. Use specified cutting and patching procedures when cutting or patching is required for any of the following activities:
   i) Fitting the parts of the work together.
   ii) Repairing existing work to remain.
   iii) Installing ill-timed work.
   iv) Removing and replacing defective and nonconforming work.
   v) Removing samples of work for testing.
   vi) Making openings in elements of work for penetrations, such as for piping, conduit, duct, and the like.
   vii) Uncovering work for observation.
   viii) Repairing damage.

B. Perform cutting and patching at earliest time feasible, unless otherwise indicated or directed by the Owner.

C. Use procedures specified in applicable product sections as well as those specified in this section:
   1. Use procedures recommended by original installer, when such information is available.
   2. Where required, obtain approval of procedures by the Owner.
3. Cut using methods that are least likely to damage adjacent work and work to remain and which will provide proper surfaces for patching.

4. Make cuts neatly with minimum disturbance of adjacent work.

5. Use appropriate tools intended for sawing or grinding and not for chopping or hammering.

6. Do not use pneumatic tools without prior approval.

7. Where installation of similar new work is included, perform patching in manner specified for installation of new work.

8. Where new work is inserted into or through the work that is cut, fit the patched work tightly to the new work.

9. Patch with seams which are durable and as invisible as possible.

10. Repair substrate prior to patching finish.

D. Employ skilled workers to perform cutting and patching work. Use the original installer of the work to perform cutting and patching.

E. Work Exposed to View: Do not cut or patch in a manner that would result in a lessening of the building's aesthetic value, as determined by the Owner.
   1. Generally, cut from exposed side into concealed spaces to avoid unnecessary damage to finish.
   2. Do not cut and patch in a manner that would result in substantial visual evidence of cut and patch work.
   3. Restore exposed patched finishes in a manner which eliminates evidence of patching and refinishing.
      (1) For continuous surfaces, extend refinish to nearest intersection, with a neat transition to adjacent surfaces.
      (2) For assemblies: Refinish entire unit.
      (3) Painted piping, conduit, and duct: Clean and repaint.
   4. Remove and replace work which is patched in a visually unacceptable manner.

F. Structural Elements: Maintain structural capacities; do not increase deflection under design load; provide reinforcing where required. Before cutting any structural member, obtain the Owner's approval of the proposed method.

G. Existing Conditions: Patch existing work to match adjacent existing work to remain.
   1. Where specified procedures for similar new work are applicable, use those procedures for cutting and patching existing construction.
   2. Take precautions to avoid damage to unanticipated utilities and structural elements.
If such elements are encountered, report nature and extent to the Project Manager / Project Engineer and request instructions as to how to proceed.

H. Concealed Work: Uncover the concealed work, cut and patch, and patch the covering work.

I. Concrete and Masonry: Use saws or drills which produce a neat cut; remove in small sections.

1. Overcuts will not be permitted.

J. Protect the part of the project which is exposed during cutting and patching operations from adverse weather.

3.05 INSTALLATION OF COMPONENTS

A. Install all products in accordance with manufacturer’s instructions and recommendations, whether conveyed in writing or not.

B. Mounting Heights: Where mounting heights are not indicated, install components at mounting normally encountered for similar components. Obtain the Project Manager / Project Engineer’s instructions for uncertain mounting heights.

C. Separate incompatible materials with suitable materials or spacing.

1. Prevent cathodic corrosion.

D. Joints in Exposed Work: Make joints of uniform widths. Where joint locations are not indicated, arrange joints for the best visual effect. When in doubt, obtain the Project Manager / Project Engineer’s instructions.

E. After installation, adjust operating components to proper operation.

3.06 PROCEDURES FOR CORRECTION OF WORK

A. The following must be replaced (repair is not acceptable):

1. Damaged surfaces exposed to view which cannot be repaired without visible evidence of repair.

2. Components which cannot be repaired to proper operating condition.


B. Repair or Replace:

1. Components which do not operate properly.

2. Surfaces exposed to view which cannot be cleaned to original condition.

3. Permanent facilities used during construction.

4. Other defective work.

C. Acceptable Repair Methods:
1. Replacing parts.
2. Refinishing.
3. Touching up with matching materials.
4. Proper adjustment of equipment.

D. When it is necessary to deviate from the Contract Documents in order to accomplish corrective action, submit a field correction request.

E. Restore permanent facilities used during construction to specified condition.

3.07 FACILITY STARTUP

A. Put each item of equipment and each system into full, satisfactory operation.

B. Prior to Startup:
   1. Verify that equipment and systems are complete, correctly connected to utilities, and tested.
   2. Comply with requirements of manufacturer.
   3. Inspect and test as required to ensure that work is installed as specified and to determine suitability for energizing.
   4. Provide power and fuel for startup and testing.
   5. Change over form temporary to permanent utility sources.
   6. Re-adjust and lubricate operating components as required to ensure smooth and unhindered operation. Check drive rotations, belt tension, control sequences, and other features which might cause damage if not properly adjusted.
   7. When specified or when required by manufacturer, have manufacturer’s representative prepare for startup or supervise such preparation.

C. Execute startup under supervision of responsible personnel in accordance with the manufacturer’s instructions. When specified or when required by manufacturer, have manufacturer’s representative perform startup.

D. After startup, adjust equipment and systems as required for proper operation. Where specified, perform tests or inspections to determine status of operation.

E. Demonstrate the operation and maintenance of equipment and systems to personnel designated by the Project Manager / Project Engineer, prior to substantial completion.
   1. Have final operating and maintenance data available during demonstration.

F. For equipment and systems which have different operation at different seasons, demonstrate operation during subsequent seasons until fully demonstrated.

3.08 FINAL CLEANING
A. Provide final cleaning as specified in Section 01720, Cleaning.

END OF SECTION
SECTION 01710
CONTRACT CLOSEOUT

PART 1 – GENERAL

1.01 CLOSEOUT PROCEDURES

A. Owner will occupy Project for the purpose of installation of equipment in accordance with General Provisions.

B. When Contractor considers Work has reached substantial completion, notify Architect to perform punchlist inspection. Give notice at least seven (7) days in advance of the time inspection is to be performed.

C. The Architect and Owner Representative will be accompanied on the inspection by the Contractor, as well as any Consultants that the Architect may request to be present.

D. The Owner will accept the project and will file for the Notice of Completion provided the work has been completed in accordance with the Contract Documents and no further measures are required and upon receipt of Certificate of Occupancy.

E. The Owner will not accept the Project or file for the Notice of Completion if the work has not been completed in accordance with the Contract Documents. A punch list will be prepared, based on the information gathered from the final inspection, and the Contractor will be required to complete the work and then call for another final inspection.

1. It is the Architect’s goal to have all punch list items resolved and completed prior to occupying the building. In general, the Contractor and his subcontractors are expected to remedy defective work within one week after Punchlist items are identified. The Contractor and subcontractors acknowledge that Owner-mandated changes may require greater flexibility, requiring additional manpower and shorter turnaround periods at no additional cost to the Owner.

F. In addition to submittals required by the conditions of the Contract, provide submittals required by governing authorities.

1.02 FINAL CLEANING

A. Execute prior to final inspection, in accordance with Section 01720, Cleaning.

B. Clean exterior surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces. Clean drainage systems.

C. Clean site; sweep paved areas, rake clean other surfaces.

D. Remove waste and surplus materials, rubbish, and construction facilities from the Project and from the site.

1.04 PROJECT RECORD DOCUMENTS

A. Prepare project record documents specified in Section 01730, Project Record Documents.

B. At Contract closeout, submit documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and a signature of Contractor.
1.05 OPERATION AND MAINTENANCE DATA
A. Refer to individual sections for operation and maintenance manuals to be submitted.
B. Submit two sets prior to final inspection, bound in 8-1/2 x 11 inch (216 x 279 mm) three-ring side binders with durable plastic covers.
C. Provide a separate volume for each system, with a table of contents and index tabs for each volume.
   1. Part 1: Directory, listing names, addresses, and telephone numbers of: Contractor.
   2. Part 2: Operation and maintenance instructions, arranged by Specification division or system. For each Specification division or system, give names, addresses, and telephone numbers of subcontractors and suppliers. List:
      a. Appropriate design criteria.
      b. List of equipment.
      c. Parts list
      d. Operating instructions.
      e. Maintenance instructions, equipment.
      f. Maintenance instructions, finishes.
      g. Shop Drawings and Product Data.
      h. Warranties.

1.06 SYSTEMS DEMONSTRATION
A. Prior to final inspection, demonstrate operation of each system to Architect and Owner personnel.
B. Instruct Owner's personnel in operation, adjustment, and maintenance of equipment and systems, using the operation and maintenance data as the basis of instruction.

1.07 WARRANTIES
A. Provide duplicate copies. Execute Contractor's submittals and assemble documents executed by subcontractors, supplies, and manufacturers. Provide table of contents and assemble in binder with durable plastic cover.
   1. Additional warrantee requirements are specified in Section 01740, "Warranties".
B. Submit material prior to final application for payment. For equipment put into use with Owner's permission during construction, submit within 10 working days after first operation.

1.08 ADDITIONAL STOCK
A. Where specified, Contractor shall provide additional stock of specified materials. Contractor
shall turn over extra stock in unopened packaging, clearly labeled as to product. Contractor shall locate additional stock as directed by Architect.

1.09 PAYMENT

A. Full compensation for the required closeout provisions shall be considered as included in the contract price paid for the various items of work involved, and no additional compensation shall be allowed therefore.

END OF SECTION
SECTION 01720
CLEANING

PART 1 - GENERAL

1.01 QUALITY ASSURANCE

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

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

1.02 PAYMENT

A. Full compensation for the required cleaning shall be considered as included in the contract price paid for the various items of work involved, and no additional compensation shall be allowed therefore.

PART 2 - PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

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

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

PART 3 - EXECUTION

3.01 PROGRESS CLEANING

A. General:

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

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

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

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

5. Keep all Owner streets clean and ensure that storm drain systems remain free of construction debris.
B. Site:

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

2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site: restack, tidy, or otherwise service all arrangements to meet the requirements of paragraph A above.

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

C. Structures:

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

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

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

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

3.02 FINAL CLEANING

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

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

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

D. Structures:

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

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

4. Polished surfaces: To all surfaces requiring the routine application of buffed polish, apply the polish recommended by the manufacturer of the material being polished.

5. Timing: Schedule final cleaning as approved by the Project Manager / Project Engineer to accept a completely clean project. Final cleaning must be complete prior to final walk through and acceptance of the project.

3.03 CLEANING DURING OWNER’S OCCUPANCY

A. Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning of the occupied spaces shall be as determined by the Architect in accordance with the General Conditions of the Contract.

END OF SECTION
PART 1 - GENERAL

1.01 QUALITY ASSURANCE

A. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff.

B. Accuracy of Records: Thoroughly coordinate all changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of drawings and other Documents where such entry is required to properly show the change. Accuracy of records shall be such that future search for items shown in the Contract Documents may reasonably rely on information obtained from the approved Record Documents.

C. Timing of Entries: Make all entries within 24 hours after receipt of information.

1.02 SUBMITTALS

A. The Architect’s approval of the current status of Record Documents will be a prerequisite to Owner's approval of requests for progress payments and final payment under the Contract.

B. Final Submittal: Prior to submitting request for final payment, submit the final Record Documents to the Architect and secure his approval.

1. Contractor shall stamp and sign the record documents. Stamp shall contain the heading "As-Builts".

1.03 PRODUCT HANDLING

A. Use all means necessary to maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer of the recorded data to the final Record Documents. In the event of loss of recorded data, use all means necessary to secure the data to the Architect's approval; such means shall include, if necessary in the opinion of the Architect, removal and replacement of concealing materials and, in such case, all replacements shall be to the standards originally specified in the Contract Documents.

1.04 PAYMENT

A. Full compensation for the required record drawings shall be considered as included in the contract price paid for the various items of work involved, and no additional compensation shall be allowed therefore.

PART 2 - PRODUCTS

2.01 RECORD DOCUMENTS

A. Job Set: Promptly following award of Contract, print one complete set of all Documents comprising the Contract.
PART 3 - EXECUTION

3.01 RECORDING

A. Identification: Immediately upon receipt of the job set described above, identify each of the Documents with the title "RECORD DOCUMENTS - JOB SET."

B. Preservation:

1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set to the approval of the Architect.

2. Do not use the job set for any purpose except entry of new data and for review by the Architect, until start of transfer of data to final Record Documents.

3. Maintain the job set at the site of Work.

C. Making entries on Drawings: Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by note and by graphic line, as required. Date all entries. Call attention to the entry by a "cloud" around the area or areas affected. In the event of overlapping changes, different colors may be used for each of the changes.

D. Making Entries on Other Documents: Clearly indicate the change by note in ink, colored pencil, or rubber stamp.

E. Conversion of Schematic Layouts:

1. In most cases on the Drawings, arrangement of conduits and circuits, piping, ducts, and other similar items, is shown schematically and is not intended to portray precise physical layout. Final physical arrangement is as determined by the Contractor, subject to the Architect's review. However, design of future modifications of the facility may require accurate information as to the final physical arrangement of items which are shown only schematically on the Drawings.

2. Show on the job set of Record Drawings, by dimension accurate to within 1", the centerline of each run of items such as are described in Paragraph 3.01.E.1 above. Clearly identify the item by accurate note such as "cast iron drain", "galv. water", etc. Show, by symbol or note, the vertical location of the item ("under slab", "in ceiling", "exposed", etc.). Make all identification sufficiently descriptive that it may be related reliably to the Specification.

3. Record elevations and exact locations of all new and existing utilities encountered or located underground.

4. Record revisions to electrical circuits.

5. The Architect may waive the requirements for conversion of schematic data where, in the Owner's judgment, such conversion serves no beneficial purpose. However, do not rely upon waivers being issued except as specifically issued in writing by the Architect.

6. Timing of Entries: Use all means necessary, including the proper tools for measurement, to determine actual locations of the installed items.

F. Contractor shall record Specification and Addenda. Contractor shall legibly mark-up each Section.
to record:

1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.

2. Changes made by Revision Order, Directive and other modification.

3. Other matters not originally specified.

G. Shop Drawings and Samples. Contractor shall:

1. Maintain as record documents.

2. Legibly annotate shop drawings and samples to record changes made after approval.

3.02 AUDIT

A. Project record documents will be reviewed monthly by the Architect, who will use the current completeness of the record documents in evaluating the monthly progress payment request.

3.03 CHANGES SUBSEQUENT TO ACCEPTANCE

A. The Contractor shall have no responsibility for recording changes in the Work subsequent to acceptance of the Work by the Owner, except for changes resulting from replacements, repairs, and alterations made by the Contractor as part of his guarantee.

END OF SECTION
PART 1 - GENERAL

1.01 RELATED REQUIREMENTS

A. General Conditions of the Contract: Warranty, and Correction of Work.

B. Section 01710 - Contract Closeout: Contract closeout procedures.

C. Section 01710 - Contract Closeout: Operation and Maintenance Data.

D. Individual Specifications Sections: Provision of warranties required for specific products or work.

1.02 FORM OF SUBMITTALS

A. Form of Warranty: Written warranties, except manufacturer's standard printed warranties, shall be on the Contractor's, Subcontractor's, material supplier, or manufacturers own letterhead, addressed to the Owner. All warranties shall be submitted in duplicate, and in the format supplied with this section, modified as approved to suit the conditions pertaining to the warranty.

B. Bind warranties in commercial quality 8 1/2" x 11" binders, with hardback, cleanable, plastic covers.

C. Label cover of each binder with typed or printed title "WARRANTIES", with title of Project; name, address, and telephone number of Contractor; and name of responsible principal.

D. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of Product or work item.

E. Separate each warranty with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

1.03 PREPARATION OF SUBMITTALS

A. Obtain warranties, executed in duplicate by responsible subcontractor, suppliers, and manufacturers, within ten days after completion of the applicable item of work. Except for items put into use with Owner's permission, beginning of time of warranty will commence on the date of substantial completion.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. All warranties shall be signed by both the General Contractor and the appropriate subcontractor.

D. Retain warranties until time specified for submittal.

1.04 TIME OF SUBMITTALS

A. For equipment or component parts of equipment put into service during construction with Architect's permission, submit documents within ten days after acceptance.
B. Make other submittals prior to final Application for Payment.

1.05 WARRANTY REQUIREMENTS

A. Contractor shall guarantee all work on the project against defective workmanship and materials for a period of one year from the date of Substantial Completion (unless longer warrantee times are indicated in specific sections of the specification).

1. Contractor shall repair or replace any such defective work in manner satisfactory to the Owner.

1.06 PAYMENT

A. Full compensation for the required warranties shall be considered as included in the contract price paid for the various items of work involved, and no additional compensation shall be allowed therefore.
WARRANTY FOR _________________________________________ WORK

We, the undersigned, hereby warrant that Work described above which we have furnished and/or installed for the following project:

San Ramon Fire Station 34 Renovation
San Ramon, California

is in accordance with the Contract Documents and that said Work as installed will fulfill or exceed all of the Warranty requirements. We agree to repair or replace our Work, together with any adjacent Work which is displaced or damaged by so doing, that proves defective in workmanship, material, or operation within a period of ______ ( ) year(s) from date of final acceptance of the project by the District or from the Date of Certificate of Substantial Completion, whichever is earlier, ordinary wear and tear and unusual abuse or neglect excepted.

In the event of our failure to comply with the above-mentioned conditions within a reasonable period of time, as determined by the District, after being notified in writing, we, the undersigned, collectively and separately do hereby authorize the District to have said defects repaired and/or replaced and made good, and to pay in discharging said Work, including all collection costs and reasonable attorney fees.

Date:________________________
(Subcontractor, Subcontractor, Manufacturer, Supplier)

By________________________________________
Title________________________________________
State License No.________________________

Date:__________
(Contractor)

By________________________________________
Title________________________________________
State License No.________________________

Local Representative to be contacted for maintenance, repair and/or replacement service:

Name:________________________________________
Address:________________________________________
Phone No.:________________________________________

END OF SECTION
SECTION 06100
ROUGH CARPENTRY

PART 1 - GENERAL

1.01 QUALITY ASSURANCE
A. Regulatory Requirements: Comply with applicable provisions of the following codes and standards, unless modified by the specifications or drawings.

1.02 SUBMITTALS
A. Submit manufacturer's Data for all items to be used under this section of work.
   1. Framing Connectors and Supports: Submit manufacturer's literature indicating compliance with plans and code requirements.
B. Submit manufacturer's Certification that wood materials meet the requirements specified.
   1. Treated Wood: Pressure preservative treatment: Provide plant certification of compliance with specified standards and stating process employed and preservative retention values.

PART 2 - PRODUCTS

2.01 GRADE STAMPS
A. Framing lumber: Identify all framing lumber by the grade stamp of the West Coast Lumber Inspection Bureau.
B. Plywood: Identify all plywood as to species, grade, and glue type by the stamp of the American Plywood Association.
C. Other: Identify all other materials of this Section by the appropriate stamp of the agency listed in the reference standards, or by such other means as are approved by the Architect.

2.02 GENERAL REQUIREMENTS
A. Moisture content at time of placing:
   1. Untreated lumber shall not exceed 19%.
   2. Treated lumber shall not exceed 19%, kiln dry after pressure treatment.
   3. Exposed Lumber shall not exceed 15%, kiln dried.
   4. Plywood shall not exceed 15%.
B. Sizing and surfacing: Mill size. All exposed surfaces of wood members shall be surfaced smooth except as indicated otherwise.

C. Pressure preservative treatment: AWPA Standards, using chromated zinc chloride or Wolman Salt (Tanalith). Touch-up parts made raw by curing or drilling.

D. Brush-On Preservative Treatment shall be "Woodtox", "Woodlife" or an approved equal.

E. Seal Coat: Where specified, and at cut ends and concealed faces apply a heavy saturation coat of penetrating sealer, except for treated wood, where treatment has included a water repellent.

2.03 LUMBER
A. See drawings for grades for specific uses and locations.

2.04 PLYWOOD
A. Structural plywood, U.S. Product Standard PS-1 per Structural Wood Notes.
   1. OSB Board is an acceptable alternative provided it is APA rated and stamped with an APA rating.

B. All plywood shall be grade-marked by the American Plywood Association (APA). Remove all sheets not grade marked.

C. Plywood used for structural purposes shall have exterior glue.

2.05 BUILDING PAPER
A. As specified in Section 09200.

2.06 WATERPROOF MEMBRANE
A. Sheet Waterproofing: Jiffy Seal 140/60, by Protecto Wrap Co., Bituthene 3000, by W. R. Grace Company, or equal.

2.07 ROUGH HARDWARE
A. Furnish all items of rough hardware, connections, bolts, etc., required to complete the work. Bolts, nuts, and washers where exposed to elements shall be hot-dipped galvanized, conforming to ASTM A 153.
   2. Bolts: Standard mild steel, square or hexagonal head machine bolts with matching nuts and cut washers, or carriage bolts with square nuts and cut washers as indicated.
   3. Lag Bolts and Screws: Conform to Fed. Spec. FF-B-561B, of sizes shown or noted on drawings.
   4. Toggle Bolts: Galvanized conforming to Fed. Spec. FF-B-588B(2), of sizes shown or noted on drawings.
5. Concrete and Masonry Anchors: Where anchors are not included in the concrete or masonry construction, anchors shall be galvanized machine screws or bolts with standard expansion-shield type concrete anchors, "Wej-It" Concrete Anchors as manufactured by Wej-It Expansion Products, Inc., Ramset Fasteners "Dynabolt", McCullock Industries, "Kwik-Bolt", or approved equal, of the size and types noted on drawings or as required. Do not use expansion bolts or anchors where other type anchors are shown or noted on the drawings.

6. Powder-Driven Fasteners: "Drive-It" system of the Power Tool Corporation, "Ramset" system of Ramset Fasteners, Inc., the equivalent system of Remington-Dupont, or approved equal. Use washers with all fasteners. Powder-driven fasteners shall not be used except where first approved by the Architect in writing.

7. Framing Anchors: Simpson Co. Strong-tie connectors or approved equal, galvanized framing connectors and joist hangers as detailed, not less than 16 gage before galvanizing, having minimum design and load capacity given on the drawings, with manufacturer supplied nails.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 WORKMANSHIP

A. All rough carpentry shall produce joints true, tight, and well nailed, with all members assembled in accordance with the Drawings and with all pertinent codes and regulations.

1. Contractor shall be responsible for shimming, trimming and other measures as required to provide framing smooth, plumb and ready to receive finish material.

B. Selection of lumber pieces:

1. Carefully select all members. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing or making connections.

2. Cut out and discard all defects which will render a piece unable to serve its intended function. Lumber may be rejected by the Architect, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.

C. Shimming: Do not shim sills, joists, short studs, trimmers, headers, lintels, or other framing components, unless noted otherwise.

3.03 TREATED LUMBER

A. Use only treated lumber for all wood bucks and nailing grounds in, or in contact with, concrete.

San Ramon Fire Protection District
Fire Station 34 Remodel
San Ramon, California

Rough Carpentry
10/12/18
06100-3
3.04 TIMBER FRAMING
A. Prior to installation, seal ends, cut edges and concealed faces using seal coat as specified.
B. Install beams and girders with crown edge up, minimum 4 inch bearing.
C. Wood Posts shall be secured to supporting and supported members by approved anchoring devices as indicated.

3.05 INSTALLATION OF PLYWOOD SHEATHING
A. Placement:
   1. Place all plywood with face grain perpendicular to supports and continuously over at least two supports, except where otherwise specifically indicated on the Drawings.
   2. Center joints accurately over supports. Unless otherwise specifically shown on the Drawings, stagger the end joints of plywood panels to achieve a minimum of continuity of joints.
   3. Leave 1/8 inch spacing between adjacent plywood sheathing at edge joints and 1/16 spacing at end joints.
B. Protection of Plywood: Protect all plywood from moisture by use of all required waterproof coverings until the plywood has in turn been covered with the next succeeding component or finish.

3.06 WOOD FURRING
A. Install wood furring as indicated and required for installation of finished surfaces.

3.07 FASTENING
A. Nailing:
   1. Use only common wire nails or spikes of the dimension shown on the Nailing Schedule, except where otherwise called for on the Drawings.
   2. For conditions not covered in the Nailing Schedule, provide penetration into the piece receiving the point of not less than 1/2 the length of the nail or spike provided, however, that 16d nails may be used to connect two pieces of two inch nominal thickness.
   3. Do all nailing without splitting wood. Pre-bore as required. Replace all split members. Shear wall plates and studs shall be sized in accordance with local code requirements to prevent splitting, regardless of whether or not those sizes are explicitly shown in details and schedules.
B. Bolting: Drill holes 1/16 inch larger in diameter than the bolts being used. Drill straight and true from one side only. Bolt threads shall not bear on wood. Use washers under head and nut where both bear on wood; use washers under all nuts.
C. Screws: For lag screws and wood screws, pre-bore holes same diameter as root of thread; enlarge holes to shank diameter for length of shank. Screw, do not drive, all lag screws and wood screws.
D. Where powder-driven anchors are approved for use, plates anchored to concrete floor shall be attached with pins not over 32 inches on center. All vertical furring shall be attached to concrete with pins not over 4 feet on center. Each pin shall penetrate to a minimum of 1-1/2 inch. Use washers with all pins. There shall be a minimum of 2 anchors for each member.

3.08 BACKING
A. Provide all blocking and backing required for fixtures, wall stops, signage and other conditions requiring backing.

3.09 CLEANING UP
A. Keep the premises in neat, safe, and orderly condition at all times during execution of this portion of the Work, free from accumulation of sawdust, cut ends, and debris.

END OF SECTION
SECTION 06200
FINISH CARPENTRY

PART 1 - GENERAL

1.01 QUALITY ASSURANCE

A. Comply with the "Manual of Millwork" of the Woodwork Institute (WI) for the grades specified.

1.02 SUBMITTALS

A. Submit shop drawings showing each of the items to be provided under this section. Shop drawings shall be to scale and shall indicate the material grade and species, full size profiles of moldings, thicknesses, size of parts, construction, fastening, blocking, clearances, assembly and erection details, applied finishes and surfacing, mill applied and/or built-in hardware, and necessary connections to work of other trades.

1. Submit Product Data for all hardware items. Include list of all hardware. When requested, provide hardware samples.

B. Submit samples of plastic laminate (with specified finish).

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered to the site in undamaged condition, stored in fully covered, well ventilated areas, and protected from extreme changes in temperature and humidity as recommended by WI Technical Bulletin 419-R - "Recommended Care and Storage of Architectural Millwork".

1.04 WARRANTY

A. Provide manufacturer's warranty against defects in materials, fabrication and installation, excluding damages caused by physical or chemical abuse or excessive heat. Warranty shall provide for replacement or repair of material and labor for a period of ten years, beginning at Date of Substantial Completion.

PART 2 - PRODUCTS

2.01 GRADES


2. Construction Type: Type I Multiple self supporting units rigidly joined together or Type II Single length sections to fit access openings.

3. Materials:

Provide with scratch resistant, Armored Protection Surface, by Formica, Wilsonart or approved equal. Color and pattern as indicated on drawings.

b. Semi-Exposed Materials: High pressure laminate cabinet liner (Melamine), color shall be white.

c. Door and Drawer Front Style: Full Flush Overlay.

d. All cabinet doors and drawer fronts to be WI Type A.

e. Provide rubber bumpers on inside corners of all doors and drawers to prevent laminate to laminate contact.

f. Adjustable shelves shall be in accordance with WI requirements, subject to a 40 pound per square foot spaced load, not to exceed 200 pounds total per shelf. Finish all edges of shelves. Finish as indicated for semi-exposed surfaces.

2.02 ACCESSORIES

A. Provide fasteners properly selected for the material to be fastened and the substrate to which the material will be fixed, designed to develop proper and adequate strength commensurate with the use.

2.03 HARDWARE

A. Provide all finish hardware for all casework included in work of this section:

1. Unless otherwise specified, all hardware shall be US32D, Satin Stainless Steel.

2. Hinges: European style, all metal concealed self-closing hinges having passed a 100,000 cycle test. Blum-Modul Series 90 with 170 degree opening, or equal. Hinges shall have a lifetime warranty as offered by the manufacturer. Provide two hinges per door under 36" high, three hinges per door over 36" high.

3. Magnetic Catches: National No. 61-570, or equal.

4. Drawer and Door Pulls: Iron Munger 96mm (wire pulls), or equal.

5. Adjustable Shelf Standards: Zinc coated steel, KV 255, Grant 120, or equal.

6. Adjustable Shelf Clips: Zinc coated steel, KV 239, Grant 21, or equal 12.

7. Personnel Locker:

   a. Roller Catch: KV K901 Bullet Catch, or equal, satin stainless steel finish.
   
   b. Clothes Hanger Rod: Bobrick B207, cut to fit.
   
   c. Towel Bar: Bobrick B6747, 18 inches, or equal.
   
   d. Mirror: Provide mirrored glass with beveled edge, size as indicated.
PART 3 - EXECUTION

3.01 COORDINATION

A. Coordinate installation of bucks, anchors, blocking, electrical, plumbing and mechanical work which is to be placed in or behind casework.

1. Contractor shall be responsible for inspection and acceptance of the wall and ceiling framing. Contractor shall verify that all framing is straight, plumb, and level, and ready for installation of casework. Commencement of casework installation indicates acceptance of existing conditions.

3.02 CONSTRUCTION


3.03 INSTALLATION

A. Install work in this section as specified in WI "Manual of Millwork."

B. Install all components plumb and level, in accordance with approved Shop Drawings and manufacturer’s product installation guidelines.

3.04 ADJUSTMENT, CLEANING FINISHING AND PROTECTION

A. Repair damaged and defective casework wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace casework. Adjust joinery for uniform appearance.

B. Clean casework on exposed and semi-exposed surfaces. Touch-up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION
SECTION 07200
BUILDING INSULATION

PART 1 - GENERAL

1.01 QUALITY ASSURANCE

A. Thermal Conductivity: Where insulation is identified by "R" value, provide thickness required to achieve indicated value.

1.02 SUBMITTALS

A. Submit manufacturer's product specifications and installations instructions for each type of insulation.

1.03 PRODUCT HANDLING

A. Protect insulation from physical damage and from becoming wet or soiled. Comply with manufacturer's recommendations for handling, storage and protection during installation.

PART 2 - PRODUCTS

2.01 BATT INSULATION

A. Insulation materials shall be fiberglass batts or blankets of the types and R-values specified for the various applications as manufactured by Owens-Corning Fiberglas Corp., or equal.

1. Sound Insulation in Interior Walls and Ceilings: Unfaced batts designed for friction fit thickness to match wall cavity thickness.

   a. Insulation materials shall have a flame spread rating of less than 75 and a smoke developed rating of less than 150.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions under which work of this Section will be installed. Correct conditions detrimental to proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected in a manner acceptable to installer.

3.02 INSTALLATION

A. Do not install insulation until such a time as the construction has progressed to the point that inclement weather will not damage or wet the insulation material.

B. Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.

C. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly
around obstructions, and fill voids with insulation. Fully insulate all small areas between closely spaced framing members. Remove products which interfere with placement. Install full height of the wall or between joists.

D. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness. Insulation shall be continuous behind all light switches, convenience outlets, etc.

E. Cut and fill insulation materials around pipes, conduits, etc., as necessary to maintain the integrity of the insulation. Where pipes are installed in spaces to receive insulation, place insulation between exterior wall and the pipe, compressing insulation if necessary.

F. Install batt insulation between framing with flanges continuously tight against framing members, using staples or nails.

G. Install insulation between framing for friction fit where enclosed between two hard surfaces. Install with wire support where enclosed on one side only.

END OF SECTION
SECTION 07270
FIRESTOPPING

PART 1 - GENERAL

1.01 QUALITY ASSURANCE

A. Qualifications of Installers: Proper installation of firestopping require that installers be thoroughly trained and experienced in the necessary skills and thoroughly familiar with the specified requirements.

1.02 SUBMITTALS

A. Comply with pertinent provisions of Section 01300.

B. Submit the following:

1. Manufacturer’s Data: Manufacturer’s data for fire-stopping including firestopping composition, performance characteristics, and installation procedures.

2. Certification that materials conform to the requirements specified.

3. UL approvals for each application and condition.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver to the job site in unopened containers or cartons bearing manufacturer’s names, brand designations and product descriptions. Store products under cover and protect from damage. Do not use damaged materials.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Firestopping System: 3M Fire Barrier System, Dow Corning Fire Stop System, or equal.

B. Product Characteristics:

1. All fire barrier materials shall be asbestos-free, intumescent in nature, and capable of maintaining an effective barrier against flame, smoke and gases in compliance with the requirements of ASTM E 814 and UL 1479.

2. Materials shall be suitable for the firestopping of penetrations made by steel, glass, plastic, and insulated pipes.

3. The rating of the firestops shall be one (1) hour minimum, but in no case less than the rating of the time-rated floor or wall assembly.
PART 3 - EXECUTION

3.01 INSTALLATION

A. Surface Preparation: Surfaces to be in contact with firestopping materials shall be free of dirt, grease, oil, loose material, rust, or other substances that may affect proper fitting or the required fire resistance.

B. Firestopping System:

1. In general, use foam for complex fire-rated wall and floor penetrations, including multiple cables, multiple conduits and pipes, and mixtures of cables, conduits, and pipes.

2. In general, use sealant for simple fire-rated wall and floor penetrations, including plumbing fixtures, simple cable systems, conduit or pipe through sleeves, and fire-rated expansion joints.

3. Coordination: Coordinate the work with other trades. Firestopping materials at penetrations of insulated pipes and ducts shall be applied prior to insulation, unless the insulation meets the requirements specified for firestopping.

C. Installation: Install firestopping materials in accordance with the manufacturer's instructions.

D. Examination of Firestopped Areas: Examine firestopped areas to ensure proper installation prior to concealing or enclosing the firestopped areas.

END OF SECTION
SECTION 07920
SEALANTS

PART 1 - GENERAL

1.01 QUALITY ASSURANCE

A. Qualifications of Installers:

   1. Proper installation of sealants require that installers be thoroughly trained and experienced in the necessary skills and thoroughly familiar with the specified requirements.

   2. For installation of sealants throughout the Work, use only personnel who have been specifically trained in such procedures and who are completely familiar with the joint details shown on the Drawings and the installation requirements called for in this Section.

B. Adhesion Tests: Manufacturer shall perform adhesion tests on substrates.

1.02 SUBMITTALS

A. Submit the following:

   1. A complete materials list showing all items proposed to be furnished and installed under this Section.

   2. Specifications, color charts, installation instructions, and general recommendations from the materials manufacturers showing procedures under which it is proposed that the materials will be installed.

   3. Certification that materials conform to the requirements of the U.S. Federal Specifications.

1.03 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver to the job site in unopened containers or cartons, each bearing product name and color.

B. Store materials in waterproof, dry sheds. Do not permit material to freeze or be stacked in such a way as to cause damage to the containers.

1.04 WARRANTY

A. Provide a warranty to the Owner, signed by the applying contractor or firm, agreeing to make any repairs or replacements required because of faulty materials or workmanship, at no additional cost to the Owner, for a period of two years from date of completion of the Work. Exterior Work that does not remain weathertight and all Work which does not retain all properties inherent in the product will be considered faulty.
1.05 MISCELLANEOUS CAULKING AND SEALING WORK

A. The entire extent of sealing work is not necessarily fully or individually described here or on the drawings. Sealing shall be provided wherever required to prevent light leakage as well as moisture leakage. Refer to drawings for conditions and related parts of the work.

PART 2 - PRODUCTS

2.01 SEALANTS


D. Type D Sealant: Fed. Spec. TT-S-1657, Type 1 or 2, butyl-base sealant, PTI 707, Tremco "Butyl", or equal.

E. Acoustic Sealant: Fed. Spec. TT-S-1657 butyl sealer, pre-extruded, non-hardening, non-skinning mastic of sufficient dimension to maintain constant contact with adjoining surfaces (not less than 3/8 inch diameter or 1/4 by 1/2 inch if in flat form), packaged in rolls. Tremco "Acoustical Sealant", Lowery's "10A Acoustical Sealer", or equal.

F. Primer, if required, shall be non-staining and as recommended by the sealant manufacturer.

G. Backup: Shall be a polyethylene foam rod of rope, closed cell and 25% wider than the joint width.

H. Bond breaker, if required, shall be as recommended by the sealant manufacturer.

I. Solvents or cleaning agents shall be as recommended by the sealant manufacturer.

J. Colors:

1. Color of sealants shall match color of adjacent work. Colors for each sealant installation will be selected from manufacturer’s standard colors by the Architect

2. In concealed installation, standard gray or black sealant may be used.

PART 3 - EXECUTION

3.01 WORKMANSHIP

A. At the start of the installation the manufacturer shall supply instruction in the use of his product to insure proper installation.
B. As work progresses, immediately remove sealant that may be adhered to adjacent materials.

3.02 JOINT DIMENSIONS

A. Joint dimension shall be as shown on the drawings. In joints up to 1/4 inch in width the depth of the sealant shall be the same as the joint width.

B. In open joints over 1/4 inch wide, the depth of the sealant shall be approximately one-half the width of the joint, but in no case less than 1/4 inch deep.

C. When open joints exceed the depth requirements, insert backup material to the necessary depth stated above. If not, place bond breaker tape in bottom of joint.

D. When perimeter joints around frames that are to be sealed do not have built-in stops, insert backup material to provide a joint with a minimum depth of 3/8 inch and a maximum depth of 1/2 inch.

3.03 APPLICATION

A. Back-up Material: Install in clean dry joints at the proper depth to provide sealant dimensions as specified earlier.

B. Masking: If required, shall be applied in continuous strips aligned with joint edge. Remove tape immediately after joints have been tooled.

C. Primer: If required, shall be used where recommended by the Sealant manufacturer.

D. Sealant: Shall be applied under pressure to clean dry joint, using hand or power guns, or other approved methods.

1. Nozzles shall be of the proper size and shape to form the required bead and completely fill the joint. Joint shall be filled from the bottom, making sure air bubbles are not left in the joint.

2. Joints shall be tooled as directed or approved, using lubricants recommended by the manufacturer. Joints shall be slightly concave and recessed at least 1/8" from the top of the joint.

3.04 SEALANT APPLICATION SCHEDULE

A. Type A: In general, at exterior or perimeters of openings in exterior walls such as concrete-to-concrete, metal-to-metal, metal-to-concrete, masonry, or stucco.

B. Type B: In general, at interior or perimeters of openings in exterior walls such as metal-to-metal, metal-to-concrete, masonry, or stucco.

C. Type C: In general, for use on areas subject to foot or vehicle traffic.

D. Type D: In general, for interior wall penetrations for piping or conduit which are to be covered by escutcheon or other trim or plate.

E. Acoustic Sealant: In general, for sound retardant sealant at sound-rated partitions or partitions with sound-retardant material therein.
3.05 MISCELLANEOUS SEALING WORK

A. The entire extent of sealing work is not necessarily fully or individually described herein. Sealing shall be provided wherever required to prevent light leakage as well as moisture leakage. Refer to drawings for conditions and related parts of the work.

B. All penetrations and openings in exterior walls shall be sealed in compliance with CAC Title 24 standards.

3.06 CLEANING

A. At the completion of this work, all surfaces adjoining joints shall be cleaned of all excess sealant and left in a neat condition subject to the approval of the Project Manager / Project Engineer.

END OF SECTION
SECTION 08110
METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 QUALITY ASSURANCE

A. Qualifications of Manufacturer: Products used in the work of this Section shall be produced by manufacturers regularly engaged in manufacture of similar items and with history of successful production acceptable to the Architect.

B. Comply with "Recommended Specifications, Standard Steel Doors and Frames", SDI 100, by the Steel Door Institute.

1.02 SUBMITTALS

A. Manufacturer's data - Submit the following:

1. Complete materials list of all items proposed to be furnished and installed under this Section.

2. Shop Drawings showing details of each frame type, elevations of each door design type, details of all openings, and all details of construction, installation, and anchorage.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Supports and Anchors: Fabricate of not less than 18 gage galvanized sheet steel.

B. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into concrete or masonry walls, complying with ASTM A 153, Class C or D as applicable.

C. Shop Applied Paint: Use rust-inhibitive baked enamel or paint, suitable as a base for specified finish paints.

2.02 FABRICATION

A. Comply with SDI 100 for minimum materials and construction requirements.

B. Exposed Fasteners: Provide countersunk flat Phillips or Jackson heads for exposed screws and bolts.

C. Finish Hardware Preparation:

1. Prepare hollow metal units to receive mortised and concealed finish hardware, including cutouts, reinforcing, drilling and tapping in accordance with final Finish Hardware Schedule and templates provided by hardware suppliers. Comply with applicable requirements of ANSI A115.
2. Reinforce hollow metal units to receive surface-applied hardware. Drilling and tapping for surface-applied finish hardware may be done at site.

3. Locate finish hardware in accordance with "Recommended Locations for Builders Hardware", published by the National Builders Hardware Association.

D. Factory Finish:
   1. Clean, treat and paint exposed surfaces of fabricated hollow metal units.
   2. Clean steel surfaces of mill scale, rust, oil, grease, dirt and other foreign materials before the application of the shop coat of paint.
   3. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive field applied finish.
   4. Finish Coat: As specified for field finishing per Section 09900.

2.03 DOORS

A. Exterior Doors: UltraDor Series by Ceco Door Company, or equal, with polystyrene core. Door shall meet ANSI/SDI A250.8, Level 4, physical performance level A.

B. Construction: Doors shall be full flush type as indicated, 1-3/4 inch thick, fabricated from steel sheets, 16 gage at exterior doors. Top and bottom edges to be flush and closed with minimum 16 gage channels at exterior doors. All edges shall be full seam welded.

C. Internal Construction: Vertical and/or horizontal steel, rigidly formed members welded to the face panels with polystyrene core bonded to the inside of both faces.

2.04 STEEL FRAMES

A. Provide metal frames of the types and styles indicated on the Drawings or schedules and complying with SDI 100 for minimum materials and construction requirements.

B. Fabricate frames of welded construction; exterior 14 gage. Miter all corners. Reinforce all hinge pockets with additional hinge reinforcement straps.

D. Door Silencers: Provide 3 silencers on strike jambs of frames.

E. Anchors: Provide anchors to secure the frame to adjoining construction. Provide steel anchors, zinc-coated or painted with rust-inhibitive paint, not lighter than 18 gauge.

   1. Wall Anchors: Provide a minimum of three anchors for each jamb. Locate anchors opposite top and bottom hinges and midway between.

      a. Stud Partitions: Weld or otherwise securely fasten anchors to backs of frames. Design anchors to be fastened to wood studs.

2.05 INFILTRATION/EXFILTRATION

A. When measured in accordance with ASTM E 283-73, doors shall not have an infiltration rate in excess of 0.5 cfm/sq. ft. per single doors or 1.0 cfm per sq. ft. per double door when subject to a pressure differential equivalent to that of a 25 mph wind.
PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install metal doors, frames and accessories in accordance with manufacturer's data, and as specified herein.

B. Setting Frames:
   1. Comply with the provisions of SDI 100, unless otherwise indicated.
   2. Set frames prior to construction of enclosing walls. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
   3. When installed in prepared openings, install sealant between frame and wall in compliance with the requirements of Section 07920.

C. Door Installation:
   1. Fit doors accurately in their respective frames, within clearances specified in SDI 100.
   2. Clearance: Unless indicated otherwise, for non-rated doors provide clearances of 1/8" at jambs and heads; 1/8" at meeting stiles for pairs of doors; and 1/4" from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4" clearance from bottom of door to top of threshold.

3.03 ADJUST AND CLEAN

A. Final Adjustments: Check and readjust operating finish hardware items in hollow metal work just prior to final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames which are warped, bowed or otherwise damaged.

B. Finish Coat Touch-up: Immediately after erection, sand smooth all rusted or damaged areas of prime coat and apply touch-up of compatible air-drying paint.

C. Painting of Metal Doors and Frames is specified in Section 09900, "Painting".

END OF SECTION
SECTION 08210
WOOD DOORS

PART 1 - GENERAL

1.01 QUALITY ASSURANCE

A. Standards:


3. WDMA IS 1A-Window and Door manufacturers Association.

4. Architectural Woodwork Institute (AWI), Section 1300 and 1500B.


B. Qualifications of Manufacturer: All wood doors shall bear the NWMA seal of approval and I.S. 1 stamp.

C. Submit Certification indicating that the product meets the requirements of NFPA 80 for Fire Rated Doors. All doors shall be the product of the same manufacturer to insure uniformity of quality and appearance throughout the project.

D. Provide each fire rated door with a label permanently attached to either the hinge stile or to the top rail, showing testing agency approval for classification scheduled.

E. The top of each door shall bear a label from the manufacturer indicating the door construction, face veneer species, cut and grade. If the doors are factory finished the label shall also have the finishing information.

F. The Door Manufacturer shall provide a letter, signed by an authorized company representative, to the Architect stating that the doors have been manufactured in compliance with this specification.

1.02 SUBMITTALS

A. Submit to scale shop drawings indicating general construction jointing methods, hardware locations, and locations of cut-outs for glass and louvers.

B. Submit manufacturer's literature for materials provided.

C. Samples: submit veneer samples of specified veneer with the specified finish. Samples are to be submitted representing the color selected on veneer typical of grain patterns and coloration for the specified specie and cut.

1.03 PRODUCT HANDLING

A. No doors shall be delivered to the building until weatherproof storage space is available. Store doors in a space having controlled temperature and humidity range between 30 and 60 percent. Stack doors flat and off the floor, supported to prevent warping. Protect doors from damage and direct exposure to sunlight.
B. Factory finished doors shall be individually wrapped in polybags to protect the finish from damage by contact with other doors.

C. Do not walk or place other material on top of stacked doors. Do not drag doors across one another.

D. Contractor shall use all means necessary to protect doors from damage prior to, during, and after installation. All damaged doors shall be repaired or replaced by the contractor at no cost to the owner.

E. Doors shall be palletized at factory in stacks of no more than 30 doors per pallet. Door edges shall be protected with heavy corner guards.

F. Replacements: In the event of damage, immediately make all repairs and replacements necessary at no additional cost to the Owner.

1.04 GUARANTEE

A. All work in this Section shall be warranted by a full door warranty (from the date of installation) against defect in materials and workmanship, including the following:

1. Delamination in any degree.

2. Warp or twist of 0.3” or more in any 3’-6” x 7’-0” section of a door.

3. Telegraphing of any part of core assembly through face to cause surface variation of 1/100” or more in a 3” span.

4. Any defect which may, in any way, impair or affect performance of the door for the purpose which it is intended. Replacement under this warranty shall include hanging, installation of hardware, and finishing.

B. Periods of warranty after date or installation for Interior solid core and mineral core shall be the life of original installation.

C. Doors must be stored, finished, hung and maintained per manufacturer’s recommendations.

1.05 COORDINATION

A. Contractor shall be responsible for coordination and acquiring of all necessary information from hardware and metal frame manufacturers. Door manufacturer shall be responsible for coordinating all necessary information received by Contractor from hardware and metal frame manufacturers, in order that doors shall be properly prepared to receive hinges and hardware. Contractor shall provide his supplier with two copies of approved frame schedule, two copies of hardware schedule, and all necessary hardware templates.

PART 2 - PRODUCTS

2.01 DOORS

A. Doors shall conform to the drawings and Door Schedule and shall be of the size, thickness, and type indicated.
1. All doors and panels, unless noted otherwise on drawings or specified otherwise herein, shall be prefit to frames and pre-machined for hardware by the manufacturer. Take accurate field measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with machining in factory.

B. Solid core wood flush doors shall be manufactured in accordance with the foregoing referenced standards, WIC grade as indicated, 5-ply wood veneer door by Marshfield Door Systems, Haley Architectural Wood Doors, Algoma, or equal.

1. Interior Doors: White Birch stained, Quartered Cut, Vertical Grain, Random Matched slats, WMDA grade 1 (premium) grade faces for semi-transparent stain finish unless otherwise indicated.
   a. Doors shall be pre-finished in color as standard with the manufacturer.
   b. Factory finish doors in accordance with WDMA G-17 Finish System Description or AWI Division 1500–S-4 – Finish System Standards. Factory finish to be water based stain and ultraviolet (UV) cured polyurethane to comply with EPA Title 5 guidelines for Volatile Organic Compound (VOC) emissions limitations.

2. Only particle board core doors shall be used. Hollow core, wood stave, mineral core, honeycomb or other similar types of cores are not acceptable.

2.02 HARDWARE
   A. Finish hardware is specified in Section 08710.

2.03 FRAMES
   A. Door frames are specified in Section 08110.

PART 3 - EXECUTION

3.01 PREPARATION
   A. Installer must examine door frames and verify that frames are correct type and have been installed as required for proper hanging of corresponding doors and notify Contractor in writing of conditions detrimental to proper and timely installation of wood doors. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to installer.

3.02 INSTALLATION
   A. Condition doors to average prevailing humidity in installation area prior to hanging.
   B. Hardware: For installation requirements refer to Section 08710.
   C. Manufacturer's Instructions: Install wood doors in accordance with manufacturer's instructions and as shown.
   D. Clearance: Unless indicated otherwise, for non-rated doors provide clearances of 1/8" at jambs and heads; 1/8" at meeting stiles for pairs of doors; and 1/4" from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4" clearance from bottom of door to top of threshold.
3.03 FINISHING

   A. Stain, if required, to be selected from manufacturer’s standard colors or custom matched to
      Architects sample. Top and bottom of the doors to be sealed. Doors to be individually enclosed in
      a polybag.

      1. All doors are to be factory finish. Any required field touchup must be done in compliance
         with VOC limits.

3.04 ADJUST AND CLEAN

   A. Operation: Rehang or replace doors which do not swing or operate freely, as directed by
      Architect.

   B. Refinish or replace doors damaged during installation, as directed by Architect.

   C. Protection and Completed Work: Protect installed wood doors from damage or deterioration until
      acceptance of work.
SECTION 08306
ACCESS PANELS

PART 1 - GENERAL

1.01 SUBMITTALS

A. Manufacturer's Data to describe and illustrate each accessory at large scale and show installation method including requirement for blocking and backing, by others.

1.02 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Pack accessories individually in a manner to protect accessory and its finish.

B. Protect adjacent or adjoining finished surfaces and work from damage during installation of work of this section.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Manufacturers: Milcor, JL Industries, Larsen's Manufacturing Co., or equal.

B. Flush Doors for Drywall Ceilings and Walls: Milcor Style DW flush panel access door, 16 gage stainless steel frame, 14 gage stainless steel door panel. Finish shall be satin stainless steel. Lock shall be flush, screwdriver-operated with steel cam.

2.02 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 PREPARATION

A. Deliver inserts and rough-in frames to jobsite at appropriate time for building-in. Provide templates and rough-in measurements as required.

B. Examine the areas and conditions under which materials are to be placed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

C. Verify that required solid blocking and backing is provided as necessary for installation of specified units.

3.02 INSTALLATION

A. Install all items true, plumb and level, securely and anchored to substrate.
3.03 ADJUST AND CLEAN

A. Adjust hardware and panels after installation for proper operation.

B. Remove and replace panels or frames that are warped, bowed, or otherwise damaged.

END OF SECTION
SECTION 08500

ALUMINUM WINDOWS

PART 1 - GENERAL

1.01 QUALITY ASSURANCE

A. Design criteria: Drawings indicate sizes, profiles and dimensional requirements of thermally improved aluminum windows. Window units having minor deviations from dimensions and profiles indicated on drawings may be accepted, provided such deviations do not materially detract from design concept or intended performances and subject to approval of the Architect.

B. Standards: Except as otherwise indicated, requirements for thermally improved aluminum windows, terminology and standards of performance, and fabrication workmanship are those specified and recommended in AAMA/NWWDA 101/93 (American Architectural Manufacturer’s Association) applicable general recommendations published by AAMA and AA.

C. Performance and Testing:

1. Except as otherwise indicated, comply with air infiltration tests, water resistance tests, uniform load deflection tests, and uniform load structural tests specified in ANSI/AAMA 302.9 for type and classification of window units required in each case.


   b. Air infiltration: Maximum 0.32 CFM per foot of overall sash crack at inward test pressure of 1.57, ASTM E 283.

   c. Water penetration: No water penetration at inward test pressure of 3.0 psf, ASTM E 547.

   d. Structural performance: No glass breakage, damage to hardware, permanent deformation at positive and negative test pressure of 30.0 psf, ASTM E 330 - 90.

2. Testing: Where manufacturer’s standard window units comply with requirements and have been tested in accordance with specified tests, provide certification by manufacturer showing compliance with such tests; otherwise, perform required tests through a recognized testing laboratory or agency and provide certified test result.

   a. Windows to meet performance standards for:

      1). ASTM E 283 - 91 Test method for infiltration rate of air leakage through exterior windows, curtain walls, and doors under specified pressure differences across the specimen.

      2). ASTM E 330 - 90 Test method for structural performance of exterior windows, and doors by uniform static air pressure difference.

      3). ASTM E 547 - 93 Test method for water penetration of exterior windows, curtain walls, and doors by cyclic static air pressure differential.
1.02 SUBMITTALS

A. **Product Data**: Submit manufacturer's technical product data, recommendations, and standard details for thermally improved aluminum windows units, including certified test laboratory reports as necessary to show compliance with requirements.

B. Submit complete materials list of all items proposed to be furnished and installed under this Section.

C. Submit Shop Drawings including wall elevations at 1/4 inch scale, typical unit elevations at 3/4 inch scale, and full size detail sections of every typical composite member and wall construction type. Show anchors, hardware, screens and other components not included in manufacturer's standard data. Include glazing details.

D. Provide certification that units comply with the requirements and have been tested in accordance with specified tests.

E. Samples: Submit samples of aluminum frame with required interior and exterior finish applied.

1.03 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01600.

1.04 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing thermally improved aluminum windows and a minimum five years documented experience.

1.05 WARRANTY

A. Provide manufacturer’s standard warranty which agrees to repair or replace units that fail in workmanship for a period of ten years from the original date purchase. Warranty includes coverage of materials and labor in full by the manufacturer.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Milgard Aluminum Series windows. Windows shall be dual glazed of the types indicated (2-1/4" frame with nailing fin)
   1. Windows shall be sliding as indicated.
   2. Finish: Provide with factory finish to match existing

B. Fabrication

   1. Fabricate framing, mullions and sash members with mechanically joined, mitered, sealed corners and joints. Supplement frame sections at corners with structural hidden corner keys.
   2. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
   3. Provide internal offset weepholes & channels to migrate moisture outside. Weepholes should be covered by weep gates.
4. Prepare components to receive anchor devices.

5. Provide integral weather stop flange to perimeter of unit.

6. Provide soft vinyl T-bulb or polypropylene fin seal weatherstripping.

7. Assemble insect screens to fully integrate with window frame. Frames to be manufactured of cambered aluminum and reinforced with rigid plastic corner keys. Screen mesh to fit taut in frame and secured. Locate screens on inside or outside of window sash or ventilator, depending on window type. Design windows and hardware to accommodate screens in a tight-fitting removable arrangement with a minimum of exposed fasteners and latches.

C. Glazing: Factory exterior glazed except where field glazing is required due to large window unit dimensions. Units shall be reglazeable without dismantling sash framing. Comply with requirements of Section 08800 for type of glass and glazing materials.

1. Provide aluminum glazing bead to match exterior window finish.

2. Glazing area in vent to be equally proportional to glazing area in fixed unit resulting in equal sight lines.

D. Hardware: Provide the manufacturer’s standard hardware fabricated from a corrosive resistant material and of sufficient strength to perform its intended function. For application of exposed hardware, use fasteners that match the finish of the hardware being fastened.

2.02 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper installation, including but not limited to pole operators, shall be new, first quality of their respective kinds, and subject to approval of the Architect.


PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Inspection: Prior to installation of the work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

3.02 INSTALLATION

A. Install all windows with adequate provision for settling, expanding, and contracting to occur without breaking glass. Windows shall be factory sized to fit in each framed opening so that the net sized window is 1/2" smaller than the framed (rough) opening to allow 1/4" clearance on all sides (tolerance +/- 1/16") and with weep holes at bottom in a weathertight manner.

B. Opening panels must be closed and locked during installation. Windows must be installed level, plumb and square with 1/4" clearance on all sides and with weep holes at bottom in a weathertight manner.
C. Headers must not be nailed. Nail through nailing fin into framing along sides and base. At the head, finishing nails may be placed 1/2" above the frame and bent down over frame to allow for header deflection. Full support is required along entire length of sill.

D. Protection:

1. Protect all finished surfaces as necessary to prevent damage during progress of the Work.

3.03 CLEANING UP

A. Immediately prior to acceptance of the Work, remove all protective materials from the windows and clean all exposed members.

B. Wash down surfaces with solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

C. Do not use petroleum distillants.

D. Abrasives: Do not use abrasives or harmful cleaning agents.

END OF SECTION
SECTION 08710
FINISH HARDWARE

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. Section includes:
   1. Mechanical door hardware for:
      a. Swinging doors.
B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:
   1. Windows
   2. Cabinets (casework), including locks in cabinets
   3. Signage
   4. Toilet accessories
   5. Overhead doors
C. Related Sections:
   1. Division 01 Section “Alternates” for alternates affecting this section.
   2. Division 07 Section “Joint Sealants” for sealant requirements applicable to threshold installation specified in this section.

1.3 REFERENCES
A. UL - Underwriters Laboratories
   1. UL 10B - Fire Test of Door Assemblies
   2. UL 10C - Positive Pressure Test of Fire Door Assemblies
   3. UL 1784 - Air Leakage Tests of Door Assemblies
   4. UL 305 - Panic Hardware
B. DHI - Door and Hardware Institute
   1. Sequence and Format for the Hardware Schedule
   2. Recommended Locations for Builders Hardware
   3. Key Systems and Nomenclature
C. ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties

1.4 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 requirements.
2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, “EXAMINATION” article, herein.

B. Action Submittals:

1. Product Data: Product data including manufacturers’ technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

2. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
   a. Door Index; include door number, heading number, and Architects hardware set number.
   b. Opening Lock Function Spreadsheet: List locking device and function for each opening.
   c. Type, style, function, size, and finish of each hardware item.
   d. Name and manufacturer of each item.
   e. Fastenings and other pertinent information.
   f. Location of each hardware set cross-referenced to indications on Drawings.
   g. Explanation of all abbreviations, symbols, and codes contained in schedule.
   h. Mounting locations for hardware.
   i. Door and frame sizes and materials.
   j. Name and phone number for local manufacturer's representative for each product.

3. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory prepared for door hardware installation.

C. Informational Submittals:

1. Qualification Data: For Supplier and Installer.

2. Certificates of Compliance:
   a. Certificates of compliance for fire-rated hardware and installation instructions if requested by Architect or Authority Having Jurisdiction.
   b. Installer Training Meeting Certification: Letter of compliance, signed by Contractor, attesting to completion of installer training meeting specified in “QUALITY ASSURANCE” article, herein.
3. Product Test Reports: For compliance with accessibility requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by qualified testing agency, for door hardware on doors located in accessible routes.

4. Warranty: Special warranty specified in this Section.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
   a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
   b. Catalog pages for each product.
   c. Name, address, and phone number of local representative for each manufacturer.
   d. Parts list for each product.
   e. Final approved hardware schedule, edited to reflect conditions as-installed.
   f. Final keying schedule
   g. Copies of floor plans with keying nomenclature
   h. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
   i. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

1.5 QUALITY ASSURANCE

A. Product Substitutions: Comply with product requirements stated in Division 01 and as specified herein.

   1. Where specific manufacturer’s product is named and accompanied by “No Substitute,” including make or model number or other designation, provide product specified. (Note: Certain products have been selected for their unique characteristics and particular project suitability.)
      a. Where no additional products or manufacturers are listed in product category, requirements for “No Substitute” govern product selection.

   2. Where products indicate “acceptable manufacturers” or “acceptable manufacturers and products”, provide product from specified manufacturers, subject to compliance with specified requirements and “Single Source Responsibility” requirements stated herein.

B. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project.

   1. Warehousing Facilities: In Project's vicinity.
   2. Scheduling Responsibility: Preparation of door hardware and keying schedules.

C. Installer Qualifications: Qualified tradesmen, skilled in application of commercial grade hardware with record of successful in-service performance for installing door hardware similar in quantity, type, and quality to that indicated for this Project.

D. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

E. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door
hardware that are listed and are identical to products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

F. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.

G. Means of Egress Doors: Latches do not require more than 5 lbf (22.2 N) to release latch. Locks do not require use of key, tool, or special knowledge for operation.

H. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in “REFERENCES” article, herein.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of wrist and that operate with force of not more than 5 lbf (22.2 N).

2. Maximum opening-force requirements:

   a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.

   b. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

3. Bevel raised thresholds with slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.

4. Adjust door closer sweep periods so that, from open position of 70 degrees, door will take at least 3 seconds to move to 3 inches (75 mm) from latch, measured to leading edge of door.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.

B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1. Deliver each article of hardware in manufacturer’s original packaging.

C. Project Conditions:

1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.

2. Provide secure lock-up for door hardware delivered to Project, but not yet installed. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

D. Protection and Damage:

1. Promptly replace products damaged during shipping.
2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

E. Deliver keys to manufacturer of key control system for subsequent delivery to County of San Diego.

F. Deliver keys and permanent cores as directed by District.

1.7 COORDINATION

A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

B. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

C. Direct shipments not permitted, unless approved by Contractor.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Years from date of Substantial Completion, for durations indicated.

   a. Closers:
      1) Mechanical: 30 years.

   b. Exit Devices:
      1) Mechanical: 3 years.

   c. Locksets:
      1) Mechanical: 3 years.

   d. Continuous Hinges: Lifetime warranty

   e. Key Blanks: Lifetime

2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Approval of manufacturers and/or products other than those listed as “Scheduled Manufacturer” or “Acceptable Manufacturers” in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.

B. Approval of products from manufacturers indicated in “Acceptable Manufacturers” is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer’s product.

C. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.

D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.2 MATERIALS

A. Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.

2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.

3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.

4. Install hardware with fasteners provided by hardware manufacturer.

B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.3 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: Ives 5BB series


B. Requirements:

1. Provide five-knuckle, ball bearing hinges conforming to ANSI/BHMA A156.1.
2. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
   a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
   b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high

3. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
   a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
   b. Interior: Heavy weight, steel, 5 inches (127 mm) high

4. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
5. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
6. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
   a. Steel Hinges: Steel pins
   b. Non-Ferrous Hinges: Stainless steel pins
   c. Out-Swinging Exterior Doors: Non-removable pins
   d. Out-Swinging Interior Lockable Doors: Non-removable pins
   e. Interior Non-lockable Doors: Non-rising pins

7. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors, and 5 inches (127 mm) at 2 inches (51 mm) or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.
8. Doors 36 inches (914 mm) wide or less furnish hinges 4-1/2 inches (114 mm) high; doors greater than 36 inches (914 mm) wide furnish hinges 5 inches (127 mm) high, heavy weight or standard weight as specified.

2.4 MORTISE LOCKS

A. Manufacturers and Products:
   1. Scheduled Manufacturer and Product: To match existing

B. Requirements:
   1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1 Operational, Grade 1 Security, and manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to “KEYING” article, herein.
   2. Indicators: Where specified, provide indicator window measuring a minimum 2 inch x 1/2 inch with 180 degree visibility. Provide messages color-coded with full text and/or symbols, as scheduled, for easy visibility.
   3. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latch-bolt. Provide deadbolt with full 1 inch (25 mm) throw, constructed of stainless steel.
   4. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
   5. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.
      a. Lever Design: Schlage 17A.
2.5 EXIT DEVICES

A. Manufacturer and Product:

1. Scheduled Manufacturer: Von Duprin 98 series.

B. Manufacturers and Products:

1. Scheduled Manufacturer: To establish standard of quality and design intent, exit device specifications have been based on Von Duprin products. Products of other manufacturers meeting or exceeding design and performance requirements specified herein will be considered for substitution subject to compliance with provisions of Division 01 Section “Product Requirements.”

C. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3-2014 Grade 1, UL certified to meet maximum 5 pound requirements according to the California Building Code section 11B-309.4, and UL listed for Panic Exit or Fire Exit Hardware. Cylinders: Refer to “KEYING” article, herein.
2. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
3. Quiet Operation: Incorporate fluid damper or other device that eliminates noise of exit device operation.
4. Touchpad: Extend minimum of one half of door width, but not the full length of exit device rail. Provide end-cap with two-point attachment to door. Match exit device finish, stainless steel for US26, US26D, US28, US32, and US32D finishes; and for all other finishes, provide compatible finish to exit device. Provide compression springs in devices, latches, and outside trims or controls; tension springs prohibited.
5. Provide rim devices with a dual cylinder or inside thumb turn cylinder option with a visual security indicator that identifies the trims locked/unlocked status of the door from the inside of the room. Indicator in unlocked state presents a 1/2 inch x 1/2 inch white metal flag with black icon at top of device head. Indicator in locked state has no flag present. Provide rim devices without the dual cylinder or inside thumb turn cylinder option capable of being retrofitted with the visual security indicator.
6. Provide exit devices with manufacturer’s approved strikes.
7. Provide exit devices cut to door width and height. Locate exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
8. Mount mechanism case flush on face of doors, or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
9. Where lever handles are specified as outside trim for exit devices, provide heavy-duty lever trims with forged or cast escutcheon plates. Provide vandal-resistant levers that will travel to 90-degree down position when more than 35 pounds of torque are applied, and which can easily be re-set.
   a. Lever Style: Match lever style of locksets.
10. Provide UL labeled fire exit hardware for fire rated openings.
11. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
2.6 CYLINDERS

A. Manufacturers:
   1. Scheduled Manufacturer: To match existing
   2. Acceptable Manufacturers: None

2.7 KEYING

A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

2.8 DOOR CLOSERS

A. Manufacturers and Products:
   1. Scheduled Manufacturer and Product: LCN 1460 series
   2. Acceptable Manufacturers and Products: Norton 8501/8501BF series, Sargent 1331 series, Yale 3501/3501BF series

B. Requirements:
   1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory.
   2. Provide door closers with fully hydraulic, full rack and pinion action cylinder.
   3. Closer Body: 1-1/4 inch (32 mm) diameter, with 5/8 inch (16 mm) diameter heat-treated pinion journal.
   4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
   5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
   6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and back-check.
   7. Pressure Relief Valve (PRV) Technology: not permitted.
   8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.9 DOOR TRIM

A. Manufacturers:
   1. Scheduled Manufacturer: Ives
   2. Acceptable Manufacturers: Trimco, Rockwood

B. Requirements:
   1. Provide push plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick and beveled 4 edges. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
2. Provide push bars of solid bar stock, diameter and length as scheduled. Provide push bars of sufficient length to span from center to center of each stile. Where required, mount back to back with pull.
3. Provide offset pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
4. Provide flush pulls as scheduled. Where required, provide back-to-back mounted model.
5. Provide pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
6. Provide pull plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
7. Provide wire pulls of solid bar stock, diameter and length as scheduled.
8. Provide decorative pulls as scheduled. Where required, mount back to back with pull.

2.10 PROTECTION PLATES
A. Manufacturers:
   1. Scheduled Manufacturer: Ives
   2. Acceptable Manufacturers: Trimco, Rockwood
B. Requirements:
   1. Provide kick plates minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
   2. Sizes of plates:
      a. Kick Plates: 10 inches (254 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs

2.11 DOOR STOPS AND HOLDERS
A. Manufacturers:
   1. Scheduled Manufacturer: Ives
   2. Acceptable Manufacturers: Trimco, Rockwood
B. Provide door stops at each door leaf:
   1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
   2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.
   3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

2.12 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING
A. Manufacturers:
   1. Scheduled Manufacturer: Zero International
   2. Acceptable Manufacturers: National Guard, Pemko
B. Requirements:

1. Provide thresholds, weather-stripping (including door sweeps, seals, and astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
2. Size of thresholds:
   a. Saddle Thresholds: 1/2 inch (13 mm) high by jamb width by door width
   b. Bumper Seal Thresholds: 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

2.13 SILENCERS

A. Manufacturers:
   1. Scheduled Manufacturer: Ives
   2. Acceptable Manufacturers: Trimco, Rockwood

B. Requirements:
   1. Provide "push-in" type silencers for hollow metal or wood frames.
   2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
   3. Omit where gaskets/seals are specified or on aluminum door frames with integrated seals.

2.14 FINISHES

A. Finish: BHMA 626/652 (US26D); except:
   1. Hinges at Exterior Doors: BHMA 630 (US32D)
   3. Protection Plates: BHMA 630 (US32D)
   4. Door Closers: Powder Coat to Match
   5. Wall Stops: BHMA 630 (US32D)
   6. Weatherstripping: Clear Anodized Aluminum
   7. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
3.2 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

2. Custom Steel Doors and Frames: HMMA 831.

B. Install each hardware item in compliance with manufacturer’s instructions and recommendations, using only fasteners provided by manufacturer.

C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.

D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.

G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

H. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Replace construction cores with permanent cores as indicated in keying section.

I. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

J. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers shall not be visible in corridors, lobbies and other public spaces unless approved by Architect.

K. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."

L. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

M. Perimeter Gaskets: Apply to head and jamb, forming seal between door and frame.

N. Meeting Stile Gaskets: Fasten to meeting stiles, forming seal when doors are closed.

O. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
3.3 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three months after date of Substantial Completion, Installer shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.4 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.5 DOOR HARDWARE SCHEDULE

A. Provide hardware as required for each door to provide for normal door operations

END OF SECTION
SECTION 08800

GLAZING

PART 1 - GENERAL

1.01 QUALITY ASSURANCE
   A. In addition to complying with all pertinent codes and regulations, install all glass in accordance with the standards of the "Glazing Manual" and the "Glazing Sealing Systems Manual" of the Flat Glass Marketing Association (FGMA).

1.02 SUBMITTALS
   A. Submit complete materials list showing all items proposed to be furnished and installed under this Section.
   B. Sufficient data to demonstrate that all such materials meet or exceed the specified requirements.

1.03 PRODUCT HANDLING
   A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all other trades.
   B. Replacements: In the event of damage, immediately make all repairs and replacements necessary at no additional cost to the Owner.

1.04 WARRANTY
   A. Warranty insulating glass units against material obstruction to vision (such as dust or film formation on inner glass surface) for a 10 year period following acceptance of the work.

PART 2 - PRODUCTS

2.01 GLAZING MATERIALS
   A. Primary Glass Standard: Provide primary glass which complies with ASTM C1036 and ASTM C1048 requirements, including those indicated by reference to type, class, quality, and form.
   B. Clear float glass: Type I (float), quality q4 (glazing quality), class 1 (transparent).
      1. Provide with "Low E Smartsun Glass" at insulated glazing.
   C. Tinted Glass: Type I, class 2 (heat absorbing and light reducing), quality q3 (glazing select).
      1. "LowE Smart Sun", by Anderson, or equal.
   D. Insulating Glass: Provide preassembled units consisting of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space and complying with ASTM E 774 for performance classification indicated as well as with other requirements specified for glass characteristics, air space, sealing system, sealant, spacer material, corner design and desiccant. All insulated glass units shall be CBA rated.
1. 7/8 inch insulating glass tested and approved in accordance with the sealed Insulating Glass Manufacturer’s Association (SIGMA) requirements.

2. Insulating glass shall be 1/4" tinted glass outboard, 3/8" airspace, and 1/4" clear glass inboard, unless noted otherwise.

E. Provide tempered glass where indicated or required by code.

2.02 GLAZING COMPOUNDS AND SEALANTS

A. Use glazing compounds and preformed glazing sealants approved for the application and, except as otherwise specified, conforming to the Glazing materials portion of the FGMA Glazing Manual.

2.03 GLAZING ACCESSORIES

A. Provide all glazing accessories required to supplement those accessories which accompany the items to the glazed, and as needed to provide a complete installation, including glazing points, clips, shims, angles, beads, settling blocks, and spacer strips.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions under which work of this Section will be installed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Insulating Glass: Comply with combined printed recommendations of insulating glass manufacturers and manufacturers of sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those of the referenced standards.

B. Install glazing in locations indicated on drawings.

C. Fix movable items securely, or in a closed and locked position, until glazing compound has thoroughly set.

D. Glass setting:
   1. Items to be glazed shall be shop-glazed or field-glazed with glass of the quality and thickness specified.
   2. Prepare surrounds and glass, unless otherwise directed, in conformance with the details and general conditions governing glazing in the FGMA Glazing Manual.

3.03 CLEANING

A. Prior to acceptance of the Work, thoroughly clean all glass and remove all labels, paint spots, sealants, and other defacements.

END OF SECTION
SECTION 09250

GYPSUM WALLBOARD

PART 1 - GENERAL

1.01 SUBMITTALS

A. Provide manufacturer's data for all material to be supplied under this section of work.
B. Provide certification that materials meet these specifications.
C. Provide manufacturer's printed instructions for installation of assemblies.
D. Provide samples of texture finishes for approval.

1.02 STORAGE AND HANDLING

A. Deliver materials in manufacturer's unopened containers, packages or bundles identified with manufacturer's name, brand, type, and grade clearly marked.
B. Store in dry areas and protect from dampness and deterioration.
C. Protect ready-mixed products from freezing.
D. Protect metal products from rusting.
E. Deliver fire-rated materials bearing testing agency label and required fire classification number.

1.03 PROJECT CONDITIONS

A. Do not install wallboard products unless installation areas comply with minimum temperature and ventilation requirements recommended by manufacturer.
B. Under slow drying conditions, allow additional drying time between coats of joint treatment.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Provide gypsum wallboard materials manufactured by United States Gypsum, Georgia Pacific, or equal.
B. Gypsum Board:
   1. Standard: ASTM C 36; or Fed. Spec. SS-L-30, Type III, Grade R, Class I; 5/8 inch thick, tapered edges, ends square cut, maximum permissible lengths.
   2. Fire Resistant: Type X or Type C as indicated. 5/8” thick minimum.

2.02 GYPSUM WALLBOARD ACCESSORIES

A. Provide gypsum wallboard accessories in accordance with Gypsum Association GA-216, and as
B. Provide all accessories such as corner beads and edge trim as metal fabrications (26 gauge minimum).

C. Joint Treatment:
   1. Tape: Perforated, conforming to ASTM C 475 or Fed. Spec. SS-J-570, Type II.
   2. Compound: Powdered or ready-mixed conforming to ASTM C 475 or Fed. Spec. SS-J-570, Type I. Taping and topping joint compound or all-purpose joint compound may be used.

D. Texturing:
   1. Wall Texturing: Provide materials manufactured by U. S. Gypsum, or equal.
   2. Ceiling Texturing: Provide materials manufactured by U. S. Gypsum, or equal.

PART 3 - EXECUTION

3.01 COORDINATION

A. Coordinate installation of bucks, anchors, blocking, electrical and mechanical work which is to be placed in or behind framing and gypsum wallboard. Allow such items to be installed after framing is completed.

3.02 GYPSUM BOARD INSTALLATION

A. Install gypsum board in accordance with Gypsum Association GA-216 recommendations.

B. Erect gypsum board in direction most practical and across studs with ends and edges occurring over continuous firm bearing.

C. Erect fire-rated assembly in accordance with UBC requirements for Fire Rated assemblies.

D. Use screws when fastening gypsum board to framing.

E. Treat cut edges and holes in moisture resistant gypsum board with sealant.

F. Place corner beads and trim/molds as shown or required. Use longest practical lengths. Place edge trim and molds where gypsum board abuts dissimilar materials and at all board terminations exposed to view. Construct reveals required by Drawings.

G. Tape, fill, and sand exposed joints, edges, corners, and openings to produce surfaces ready to receive finishes except at non-exposed-to-view conditions. Feather coats onto adjoining surfaces so that camber is maximum of 1/16 inch. Finishing of taping is not required at areas to receive tiles, and areas above exposed-to-view ceilings.

H. Remove and correct or replace defective work in a manner acceptable to the Architect.

I. Hang ceiling and soffit systems level and plumb, in true alignment with adjacent surfaces and walls.
J. Construct tight fitting joints in exposed ceiling members, continuously around openings and obstructions.

3.03 TRIM

A. Apply edge casing plumb and true to all openings and exposed ends of wallboard abutting another material or as specifically detailed otherwise. Use continuous lengths where possible.

B. Apply corner bead plumb and true to all exposed exterior corners in continuous lengths whenever possible.

C. The drawings do not purport to show all locations and all requirements for metal trim in connection with the work of this Section. Carefully study the drawings and the job conditions; provide in place, all metal trim recommended by the manufacturer of the gypsum wallboard used and as required for a finished installation.

3.04 APPLICATION OF TEXTURE FINISH

A. Finish: All wall surfaces shall receive a "Level 4" smooth finish minimum.

B. Surface Preparation and Primer: Prepare and prime drywall and other surfaces in strict accordance with texture finish manufacturer's instructions prior to installing texture. Apply primer to all surfaces to receive texture finish. Primer shall be installed to prevent "Joint-Banding" from transferring through finished painting. Gypsum Board shall be inspected by Architect to approve priming prior to texture.

C. Finish Application: Mix and apply finish to drywall and other surfaces indicated to receive finish in strict accordance with manufacturer's instructions to produce a uniform texture without starved spots or other evidence of thin application, and free of application patterns.

D. Remove any texture droppings or overspray from door frames, windows and other adjoining work.

END OF SECTION
SECTION 09510
ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.01 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable provisions of the following codes and standards, unless modified by the specifications or drawings.


2. ASTM C 635 - Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.

3. ASTM C 636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Paneling.

1.02 SUBMITTALS

A. Submit shop drawings indicating grid layout, related dimensioning, junctions with other work or ceiling finishes, and interrelation of mechanical and electrical systems.

1. Reproduction of contract drawings as the basis of shop drawings for the work of this section is not acceptable.

2. Field check existing walls and ceiling conditions before making layout so that shop drawings reflect the existing conditions.

B. Submit product data, specifications, and manufacturer's installation instructions.

C. Submit samples as follows:

1. 12-inch long samples of main tees, cross tees and perimeter molding.

2. Full sized samples of each type acoustical board and tile used in the work.

D. Extra Stock: Provide Owner with an additional five percent of each type of acoustic panel and tile and ceiling grid in unbroken packages for use in repairs or replacements.

1.03 ENVIRONMENTAL REQUIREMENTS

A. Do not install acoustical ceilings until building is enclosed, sufficient heat is provided, dust generating activities have terminated and overhead mechanical work is completed, tested and approved.

B. Permit wet work to dry prior to commencement of installation.

C. Maintain uniform temperatures of minimum (60°C) and humidity of 20 percent to 40 percent prior to, during and after installation.
PART 2 - PRODUCTS

2.01 MATERIALS

A. Suspension System:
   1. Manufacturers: Donn Products, Chicago Metalic Corp., or equal, conforming to ASTM C 635, heavy duty system, sized to fit specified tile.
   2. Grid: Non-fire rated exposed T, all components die cut and interlocking, Donn "Centricitee" 9/16" Exposed Tee System, to be compatible with specified ceiling tile, or equal.
   3. Accessories: Stabilizer bars, furring clips, splices, and edge moldings as required to complete and complement suspended ceiling grid system.
   4. Materials/Finish: Commercial quality cold rolled steel with galvanized coating; white baked-on vinyl finish on exposed surfaces.
   5. Carrying Channels and Hangers: Galvanized steel; size and type to suit application and to rigidly secure the complete acoustic unit ceiling system, with maximum deflection of 1/360.

B. Acoustical Panels: "Cortega Lay-In", 24" x 24" x 5/8", angled tegular edge, by Armstrong World Industries, or equal. Color shall be white.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install acoustical ceiling systems in accordance with UBC Standard 47-18 and ASTM C 363 to produce finished ceiling true to lines and levels and free from warped, soiled or damaged grid or lay-in panels.

B. Provide all necessary bracing to comply with requirements for lateral resistance.

C. Install ceiling systems in a manner capable of supporting all superimposed loads, with maximum permissible deflection of 1/360 of span and maximum surface deviation of 1/8 inch in 10 ft (1/960).

D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work. Ensure the layout of hangers and carrying channels are located to accommodate fittings and units of equipment which are to be placed after the installation of ceiling grid systems.

E. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest adjacent hangers and related carrying channels as required to span the required distance.

F. Supply hangers or inserts for installation to the respective section in ample time and with clear instructions for their correct placement. Provide additional hangers and inserts as required.

G. Hang independently of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of the longitudinal axis or face plane of adjacent members.

H. Center ceiling systems on room axis leaving equal border pieces.

I. Do not support fixtures from or on main runners or cross runners if weight of the fixture causes the total dead load to exceed the deflection capability. In such cases, support fixture loads by
supplementary hangers located within 6 inches of each corner, or support the fixtures independently.

J. Do not install fixtures so that main runners and cross runners will be eccentrically loaded. Where fixture installation would produce rotation of runners, provide stabilizer bars.

K. Install edge moldings at intersection of ceiling and vertical surfaces, using maximum lengths, straight, true to line and level. Miter corners. Provide edge moldings at junctions with other ceiling finishes.

L. Fit acoustic lay-in panels in place, free from damaged edges or other defects detrimental to appearance and function. Fit border units neatly against abutting surfaces.

M. Install lay-in panels level, in uniform plane and free from twist, warp and dents.

3.02 ADJUSTMENTS AND CLEANING

A. Adjust any sags or twists which develop in the ceiling systems and replace any part which is damaged or faulty.

B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION
PART 1 - GENERAL

1.01 SUBMITTALS

A. Submit complete list of all materials included in this Section.

B. Submit samples of each item and color available in the specified products from the proposed manufacturer.

C. Extra Stock: Provide Owner with an additional five percent of each type of specified product in unopened packages for use in repairs or replacements. The cost of this material shall be included in the Contractor’s bid or the contract price.

D. The VOC content of adhesives and sealants used must be less than the current VOC content limits of the South Coast Air Quality Management District (SCAQMD) Rule #1168, AND all sealants used as fillers must meet or exceed the requirements of the Bay Area Air Quality Management District Regulation 8, Rule 51.

1.02 PRODUCT HANDLING

A. Delivery and Storage: Deliver materials to the job site and store in their original unopened containers with all labels intact and legible at time of use. Store in strict accordance with the manufacturers’ recommendations.

B. Protection: Use all means necessary to protect materials of this Section before, during and after installation and to protect installed work and materials of all other trades.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Adhesives: As recommended by manufacturer which comply with the VOC limits noted above.

B. Edging strips: Rubber transition strip as indicated. Color as indicated or as selected by Architect from manufacturer’s standard colors.

C. Rubber Base: Topset (cove) 4" high rubber base, by Johnsonite, Burke Flooring, Roppe, or approved equal.

1. Color as indicated on drawings.

D. Luxury Vinyl Tile: By Johnsonite/Tarkett or approved equal.

1. Color as indicated on drawings.

E. Floor Patching Compound/Underlayment: Latex type as recommended by the flooring manufacturer.
G. Crack Filler: For concrete floor surfaces use non-shrinking cement mortar as recommended by the flooring manufacturer.

2.02 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper installation of the work of this Section, shall be as recommended by the manufacturer of the resilient materials used.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the areas and conditions under which resilient flooring is to be placed. Correct conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected.

B. Surface shall be smooth, level, at the required finish elevation, without more than 1/8" in 10'-0" variation from level or slopes shown.

C. Alkalinity test and moisture test must be performed. PH level should be in the range of 7 to 8.5. Moisture content must not exceed manufacturer’s recommendations (verify using the calcium chloride test as per ASTM F 1869).

1. Where test results exceed manufacturer’s recommended limits apply sealer as specified.

3.02 PREPARATION

A. Subfloors: Prior to start of laying flooring, broom clean or vacuum all surfaces to be covered and inspect the subfloors. Start of installation will indicate acceptance of subfloor conditions.

1. Install crack filler and floor patching compound as required to provide smooth subfloor prior to application of flooring.

B. Concrete Primer: Apply concrete slab primer if recommended by flooring manufacturer, prior to application of the adhesive. Apply in compliance with manufacturer's directions.

3.03 FLOOR INSTALLATION

A. Install per manufacturer’s recommendations. Fit joints tight and vertical. Maintain minimum measurement of 18" between joints.

B. Scribe and fit to door frames and other obstructions.

C. Install straight and level to variation of plus or minus 1/8 inch over 10 feet (1/960).

D. No gaping of material will be permitted. Flooring must be completely adhered to slab material.

3.04 BASE INSTALLATION

A. Fit joints tight and vertical. Maintain minimum measurement of 18" between joints.

B. Miter internal corners. Use pre-molded sections for external corners and exposed ends.
C. Install base on solid backing. Adhere tightly to wall and floor surface.

D. Scribe and fit to door frames and other obstructions.

E. Install straight and level to variation of plus or minus 1/8 inch over 10 feet (1/960).

F. No gaping of material will be permitted. Base must be completely adhered to wall material.

3.05 CLEANING AND PROTECTION

A. Remove excess adhesive or other surface blemishes from flooring, using neutral type cleaners recommended by the flooring manufacturer. Protect installed flooring from damage until acceptance by the Owner.

3.06 FINISHING

A. After completion of the Work and just prior to final inspection, thoroughly clean resilient flooring and accessories. Apply wax and buff vinyl composition tile, with the type of wax, number of coats, and buffing procedures recommended by the flooring manufacturer.

END OF SECTION
PART 1 – GENERAL

1.00 DESCRIPTION

A. Extent of painting work is indicated on drawings and schedules, and as herein specified.

B. Work includes painting and finishing of interior and exterior exposed items and surfaces throughout project, except as otherwise indicated.

C. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.

D. Work includes field painting of exposed bare and covered pipes and ducts (including color coding), and of hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under mechanical and electrical work, except as otherwise indicated.

E. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

F. Surfaces to be painted: Except where natural finish of material is specifically noted as a surface not to be painted, paint exposed surfaces whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. If color or finish is not designated, Architect will select these from standard colors or finishes available.

G. Following categories of work are not included as part of field-applied finish work.
   1. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer-finishing is specified for such items.
   2. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, pipe spaces, and shafts.
   3. Finished Metal Surfaces: Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting.
   4. Operating Parts: Unless otherwise indicated, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor, and fan shafts will not require finish painting.

H. Following categories of work are included under other sections of these specifications:
   1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, metal fabrication, metal doors and frames, and similar items.
   2. Unless otherwise specified, shop priming of fabricated components such as architectural woodwork, wood casework, and shop-fabricated or factory-built
mechanical and electrical equipment or accessories is included under other sections of these specifications.

3. Mechanical and Electrical Work: Painting of mechanical and electrical work is specified in Division 15 and 16, respectively.

I. Do not paint over any code-required labels, such as Underwriters’ Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

1.01 QUALITY ASSURANCE

A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.

B. Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.

1.02 SUBMITTALS

A. Manufacturer’s Data:

1. Complete materials list of all items proposed to be furnished and installed under this Section.

2. Manufacturers’ specifications and other data required to demonstrate compliance with the specified requirements.

3. For information only, submit two copies of manufacturer’s specifications and application instructions for each material.

4. The VOC content of interior paint materials used must be less than the current VOC content limits of the South Coast Air Quality Management District (SCAQMD) Rule #1168, AND all sealants used as fillers must meet or exceed the requirements of the Bay Area Air Quality Management District Regulation 8, Rule 51. Submit data indicating VOC content of each material proposed for use.

B. Samples: Following the selection of colors and glosses by the Architect, submit samples for the Architect’s review of color and texture only. Provide a listing of material and application for each coat of each finish sample.

1. Submit six draw-down samples of each paint color and gloss type indicated.

a. Stain samples shall be submitted on samples of actual wood type being used on project.

1.03 PRODUCT HANDLING

A. Deliver all materials to the job site in original, new, and unopened containers bearing the manufacturer’s name and label.

B. Provide proper storage to prevent damage to, and deterioration of, paint materials.
C. Use all means necessary to protect the materials of this Section before, during, and after installation and to protect the work and materials of all other trades.

D. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

1.04 JOB CONDITIONS

A. Surface Temperatures: Do not apply solvent-thinned paints when the temperature of surfaces to be painted and the surrounding air temperature are below 45 degrees F, unless otherwise permitted by the manufacturer’s printed instructions.

B. Weather Conditions: Do not apply paint in rain, fog, or mist; or when the relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by the manufacturer’s printed instructions. Applications may be continued during inclement weather within the temperature limits specified by the paint manufacturer during application and drying periods.

1.05 REGULATORY REQUIREMENTS

A. All material and application of material shall comply with all air pollution control regulations.

1.06 EXTRA STOCK

A. Amount: Upon completion of the work of this Section, deliver to the Owner an extra stock equaling 10% of each color, type, and gloss of paint used on the Work, but not more than five gallons for each.

B. Packaging: Tightly seal each container and clearly label with the contents and location used.

1.07 GUARANTEE

A. Guarantee the painting work, in writing, against peeling, fading, cracking, blistering, or crazing for a period of three years from the time the Notice of Completion is filed.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Principal paint materials, unless otherwise indicated, shall be as manufactured by Sherwin-Williams, Dunn-Edwards Corp., Vista Paint, or equal.

B. Colors and Glosses: The Architect will select colors to be used in the various types of paint specified and indicated and will be the sole judge of acceptability of the various glosses obtained from the materials proposed to be used in the Work.

C. Undercoats and Thinners: Provide undercoat paint produced by the same manufacturer as the finish coat. Use only the thinners recommended by the paint manufacturer, and use only to the recommended limits. Insofar as practicable, use undercoat, finish coat, and thinner material as parts of a unified system of paint finish.
2.02 APPLICATION EQUIPMENT

A. For application of the approved paint, use only such equipment as is recommended for application of the particular paint by the manufacturer of the particular paint.

B. Compatibility: Prior to actual use of application equipment, use all means necessary to verify that the proposed equipment is actually compatible with the material to be applied and that the integrity of the finish will not be jeopardized by use of the proposed application equipment.

2.03 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper installation of the work of this Section, shall be new first-quality of their respective kinds, and as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Inspection: Prior to installation of the work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence. Verify that painting may be completed in strict accordance with the original design and with the manufacturer's recommendations.

B. Discrepancies: Do not proceed in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 MATERIALS PREPARATION

A. Mix and prepare painting materials in strict accordance with the manufacturer's recommendations.

B. Store materials not in actual use in tightly covered containers.

C. Maintain containers used in storage, mixing, and application of paint in a clean condition, free from foreign materials and residue.

D. Stirring: Stir all materials before application to produce a mixture of uniform density, and as required during the application of materials. Do not stir into the material any film which may form on the surface. Remove the film and, if necessary, strain the material before using.

3.03 SURFACE PREPARATION

A. Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's recommendations.

B. Remove all removable items which are in place and are not scheduled to receive paint finish, or provide surface-applied protection prior to surface preparation and painting operations.

C. Following completion of painting in each space or area, reinstall the removed items by using workmen skilled in the necessary trades.

D. Clean each surface to be painted prior to applying paint or surface treatment.
E. Remove oil and grease with clean cloths and cleaning solvents of low toxicity and a flash point in excess of 100 degrees F, (38 degrees C) prior to start of mechanical cleaning.

F. Schedule the cleaning and painting so that dust and other contaminants from the cleaning process will not fall onto wet newly painted surfaces.

G. Preparation of Metal Surfaces:
   1. Thoroughly clean all surfaces until they are completely free from dirt, oil, and grease. Clean cutting oil from exposed pipes.
   2. On galvanized surfaces, use solvent for the initial cleaning and then treat the surface thoroughly with phosphoric acid etch. Remove all etching solution before proceeding.
   3. Allow to dry thoroughly before application of paint.
   4. Apply primer the same day pretreatment is applied.

3.04 PAINT APPLICATION

A. On all removable panels and all hinged panels, paint the back sides to match the exposed sides.

B. Apply one heavy coat of flat black paint on all construction visible through screen vents and grilles.

C. Drying: Allow sufficient drying time between coats. Modify the period as recommended by the material manufacturer to suit adverse weather conditions.

D. Brush and Roller Application: Apply all coats onto the surfaces in an even film. Cloudiness, spotting, holidays, laps, brush or roller marks, runs, sags, ropiness, and other surface imperfections will not be acceptable.

E. Spray Application: Wherever spray application is used, apply each coat to provide the equivalent hiding of brush-applied coats. Do not double back with spray equipment for the purpose of building up film thickness of two coats in one pass.
   1. Backroll all sprayed surfaces to provide uniform finish appearance.

F. Completed work shall match the approved Samples for color, texture, and coverage. Remove, refinish, or repaint all work not in compliance with specified requirements.

3.05 PAINTING SCHEDULE - EXTERIOR

<table>
<thead>
<tr>
<th>Sherwin Williams</th>
<th>Dunn-Edwards</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Ferrous Metal - Gloss:</td>
<td></td>
</tr>
<tr>
<td>1st Coat: Procryl Primer B66-310</td>
<td>43-4 Bloc-Rust</td>
</tr>
<tr>
<td>2nd Coat: ProlIndustrial Acrylic B66-600</td>
<td>Syn-lustro #10</td>
</tr>
<tr>
<td>3rd Coat: ProlIndustrial Acrylic B66-600</td>
<td>Syn-lustro #10</td>
</tr>
</tbody>
</table>
B. Non-Ferrous Metal - Gloss:

<table>
<thead>
<tr>
<th>Pretreatment</th>
<th>SSPC SP-1</th>
<th>GE123Galv-Etch</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd Coat:</td>
<td>ProIndustrial Acrylic B66-600</td>
<td>W960</td>
</tr>
<tr>
<td>3rd Coat:</td>
<td>ProIndustrial Acrylic B66-600</td>
<td>W960</td>
</tr>
</tbody>
</table>

C. Wood - paint:

| 1st Coat:          | PrepRite Problock B51W8020 | E-Z Prime W708 |
| 2nd Coat:          | Solo Acrylic Gloss A77 | W960 |
| 3rd Coat:          | Solo Acrylic Gloss A77 | W960 |

D. Stucco - Painted:

| 1st Coat:          | PrepRite Problock B51W8020 | E-Z Prime W708 |
| 2nd Coat:          | Solo Acrylic Gloss A77 | W960 |
| 3rd Coat:          | Solo Acrylic Gloss A77 | W960 |

3.06 PAINTING SCHEDULE - INTERIOR

A. Finish - Eggshell Wall Paint:

1. Gypsum Board:

| 1st Coat:          | Promar 200 Zero VOC Primer B28W2600 | W600 Ecosheild Primer |
| 2nd Coat:          | ProMar 200 Zero VOC Eggshell B20-2600 | W602 Ecosheild Low Sheen |
| 3rd Coat:          | ProMar 200 Zero VOC Eggshell B20-2600 | W602 Ecosheild Low Sheen |

2. Metal, Ferrous:

| 1st Coat:          | Pro-Cryl Universal Metal Primer B66-310 | 43-5 Corrobar W602 |
| 2nd Coat:          | ProIndustrial Acrylic B66-600 | W602 Ecosheild Low Sheen |
| 3rd Coat:          | ProIndustrial Acrylic B66-600 | W602 Ecosheild Low Sheen |

3. Metal - Non-Ferrous:

| Pretreatment       | Pro-Cryl Universal Metal Primer B66-310 | W 600 Ecosheild Primer |
2nd Coat: ProIndustrial Acrylic W602
B66-660 Ecoshield Low Sheen
3rd Coat: ProIndustrial Acrylic W602
B66-660 Ecoshield Low Sheen

B. Finish - Semi-Gloss Paint:

1. Gypsum Board:

   1st Coat: Promar 200 Zero VOC W600
             Primer B28W2600 Ecoshield Primer
   2nd Coat: ProMar 200 Zero VOC W603
             Semigloss B31-2600 Ecoshield Semigloss
   3rd Coat: ProMar 200 Zero VOC W603
             Semigloss B31-2600 Ecoshield Semigloss

2. Wood:

   1st Coat: PrepRite Problock W600
             B51W8020 Ecoshield Primer
   2nd Coat: Solo Acrylic Semigloss W901V
             A76 Permasheen Semiglos
   3rd Coat: Solo Acrylic Semigloss W901V
             A76 Permasheen Semiglos

3. Metal, Ferrous:

   1st Coat: ProCryl Primer W602
             B66-310 Corrobar
   2nd Coat: ProIndustrial Acrylic W901V
             B66-650 Permasheen Semigloss
   3rd Coat: ProIndustrial Acrylic W901V
             B66-650 Permasheen Semigloss

4. Metal, Non-Ferrous:

   1st Coat: ProCryl Primer W2400 Latex
             B66-310 Enamel Undercoater
   2nd Coat: ProIndustrial Acrylic W901V
             B66-650 Permasheen Semiglos
   3rd Coat: ProIndustrial Acrylic W901V
             B66-650 Permasheen Semiglos

END OF SECTION
SECTION 15050
MECHANICAL GENERAL PROVISIONS

PART 1 - GENERAL REQUIREMENTS

1.1 GENERAL CONDITIONS:

The general conditions and Division 1 are a part of this section and the contract for this work and apply to this section as fully as if repeated herein. This section, 15050, applies to all Division 15 categories, including but not limited to:

Section 15400 Plumbing

A. Reference to Other Sections: The applicable requirements from the above sections shall form a part of the mechanical work and each section shall consult the other sections in detail for general and specific requirements.

1.2 SCOPE:

These Division 15 specifications and the accompanying drawings are intended to comprise the furnishing of all labor, and the furnishing and installing of all materials, equipment and supplies as specified herein and required for the satisfactory completion by the Contractor of all work pertaining to mechanical trades.

1.3 EXPLANATION OF DRAWINGS AND REFERENCE TO SCHEDULES:

A. The drawings and these specifications are complementary to each other in that all apparatus, materials and equipment outlined in the drawings and/or specified herein shall be considered essential to the contract.

B. The specifications are intended to describe the quality and character of the materials and equipment and methods of installation. All miscellaneous items of work and materials necessary for the completion of the installation shall be provided, whether or not mentioned in the specifications or shown on the drawings.

C. Space allotted, clearances, access, electrical data, structural supports, etc., on drawings, is for equipment models and sizes as listed in schedules on plans. The Contractor shall assume the responsibility for the coordination with other trades required in the use of equal or substitute equipment or materials and pay all difference in cost arising from such substitutions, regardless of approval.

D. Separate Sections cover the Site Work, Architectural Work and the Electrical Work. The Contractor shall familiarize themselves with the entire specification.

E. Should there be any question as to the scope of the work for which the Contractor is responsible, they shall ask the Architect for an interpretation before submitting their bid. In the event that the Contractor finds discrepancies or omissions or is in doubt as to the exact meaning of the plans and/or specifications, they shall, before submitting bid, contact the Mechanical Engineer for clarification.

F. For purposes of clearness and legibility, drawings are essentially diagrammatic and, although size and location of equipment are drawn to scale wherever possible, the Contractor shall make use of all data in all the contract documents and shall verify this information at building site.
G. The drawings indicate required size and points of termination and suggest proper routes to conform to structure, avoid obstructions and preserve clearances. However, it is not intended that drawings indicate all necessary offsets, and it shall be the work of the Contractor to make the installation in such a manner as to conform to structure, avoid obstruction, preserve headroom and keep openings and passageways clear.

H. It is intended that all apparatus be located symmetrical with architectural elements. Refer to architectural details in completing the correlating work.

I. The Contractor shall fully inform themselves regarding any and all peculiarities and limitations of the spaces available for the installation of all work and materials furnished and installed under the contract. They shall exercise due and particular caution to determine that all parts of their work are made quickly and easily accessible.

J. The Contractor shall study all drawings and specifications to determine any conflict with ordinances and statutes. Any errors or omissions shall be reported, and any changes shall be shown in the as-built drawings and the additional work performed at no cost to the Owner.

K. The submittal of bid shall indicate that the Contractor has examined the site and the drawings and has included all required allowances in their bid. They shall also determine in advance and make allowances for the methods of installing and connecting the equipment, the means of getting equipment in to place and they shall make themselves familiar with all the requirements of the contract. No allowance will be made for any error resulting from the Contractor's failure to visit job site and to review drawings, and bid shall include costs for all required drawings and changes as outlined above.

L. The Contract Drawings indicate the extent, the general location and arrangement of equipment, piping, ductwork, etc. Equipment, piping and ductwork shall be located to avoid interference with electrical, plumbing and structural features. All locations for mechanical work shall be checked and coordinated with the building, structural, electrical work.

M. If any conflicts occur necessitating departures from the Contract Drawings, details of departures and reasons therefore shall be submitted as soon as practical for written approval, and the piping, ductwork, fixtures or equipment affected shall not be installed until approval is received.

N. Reference to Drawing Schedules:
   1. Refer to equipment schedule for unit identification number and corresponding capacity and design requirements.
   2. Wherever schedules or notes appear on the Drawings or in the specifications in which sizes and capacities of equipment are indicated, the equipment furnished and installed under this contract shall meet the following requirements under operating conditions:

1.4 DEFINITIONS:

A. "Provide" shall mean "provide complete in place," that is, "furnish and install."
B. "Piping" shall mean pipes, fittings, valves and all like pipe accessories connected thereto.

C. Pressure ratings specified, such as for valves and the like, is the design working pressure and is for and with reference to the fluid which the device will serve.

D. "Ductwork" shall mean ducts, plenums, compartments, casings or any like devices, including the building structure, which is used to convey or contain air.

E. "Building Boundary" shall mean exterior building walls.

F. "Mechanical Work" shall mean all work specified and shown in the Division 15, "Mechanical," categories. Mechanical Work generally includes: Plumbing, Heating, Ventilating, Air Conditioning and Fire Protection systems.

1.5 CODES AND STANDARDS:

A. All work, material or equipment shall comply with the requirements of codes, ordinances and regulations of the local Government having jurisdiction at the location of the work, including the regulations of serving utilities, and any participating Government agencies having jurisdiction.

B. The latest editions of the following Specifications, Codes and Standards shall form a part of these specifications, the same as if herein written out in full, and all materials and installations include but not be limited to:

1. CMC (California Mechanical Code)
2. ASHRAE (American Society of Heating, Refrigeration and Air Conditioning)
3. UL (Underwriters’ Laboratories, Inc.)
4. AMCA (Air Moving and Conditioning Associates)
5. California State Division of Industrial Safety
6. SMACNA HVAC Duct Construction Standards
7. CBC (California Building Code)
8. NFPA (National Fire Protection Association)
9. San Diego County Codes
10. California Administrative Code, Title 24
11. Requirements of the State Fire Marshall
12. National Electrical Code
13. ASTM (American Society for Testing and Materials)
14. AGA (American Gas Association)
15. OSHA
16. CPC (California Plumbing Code)

C. No requirement of these drawings and specifications shall be construed to void any of the provisions of the above standards. No apparatus, equipment, device or construction shall be installed which will provide a cross connection permitting any backflow or siphonage from any source into the domestic water supply system.

1.6 PERMITS AND FEES:

Obtain all permits, patent rights, and licenses that are required for the performing of the work by all laws, ordinances, rules and regulations, or orders of any officer and/or body, give all notices necessary in connection therewith, and pay all fees relating thereto and all costs and expenses incurred on account thereof. No work shall be covered before inspection by the jurisdictional authority and the Architect.

1.7 SUPERVISION AND COOPERATION:

A. The Contractor shall include the services of experienced superintendents for each subsection who shall be constantly in charge of the work, together with the qualified journeymen, helpers, and laborers, required to properly unload, install, connect, adjust, start, operate and test the work involved, including equipment and materials furnished by others.

B. The work under this section shall be in cooperation with the work of other trades to prevent conflict or interference and to aid rapid completion of the overall project.

1.8 PROJECT SITE VISIT:

Periodic visits to the project site by the Engineer are for the expressed purpose of verifying compliance with the contract documents. Such site visits shall not be construed as construction supervision, i.e., the Engineer assumes no responsibility for providing a safe place for the performance of the work by the Contractor or the Contractor’s employees or the safety of the supplies of the Contractor. Neither shall such site visits relieve the Contractor of the responsibility for the discovery of their own errors and the correction of them, nor of the responsibility of properly performing the work.

1.9 COORDINATION:

A. The Contractor shall be responsible for providing all information, drawings or layouts of equipment or work under this section which affect the work of the other trades.

B. In case changes in the indicated locations or arrangements are necessary due to developed conditions in the construction, or rearrangement of furnishings, or equipment, these changes shall be made without extra cost to the Owner, provided the change is ordered before work directly connected is installed, and no extra materials are required.

1.10EXISTING UTILITIES:

A. The location of utilities shown on the plumbing plans is the best-known information available at time of design. The Contractor shall contact the appropriate agencies and confirm the information and make arrangements for connection thereto, prior to excavation and installation of any piping or systems.
B. Prior to installation of any waste and soil lines the Contractor shall physically verify whether the building sewer can be installed and properly connected to the sewer main. Any work requiring added expense which is caused by the Contractor to make such physical verification shall be borne by the Contractor.

1.11 UTILITY SERVICES DURING CONSTRUCTION:

All water and electric power used for construction shall be paid for by the Contractor.

1.12 SUBMITTALS AND SHOP DRAWINGS:

A. Equipment and materials shall be submitted to the Architect for approval within 30 days after award of Contract and prior to fabrication or purchase of equipment and materials.

B. Installation of materials or ordering of equipment prior to approval of submittals is done entirely at the risk of the Contractor.

C. Unless otherwise specifically directed in the following specifications, the submittals by the Contractor to the Architect shall be as follows:

1. Submit all items at one time in a neat and orderly manner with index tabs. A partial submittal will not be acceptable.

2. Reference catalog cuts and brochures of products to proper paragraph in specifications. Furnish numerical index by specification article number, listing product name, catalog number and reference to page number of submittal brochure.

3. Cross reference individual catalog numbers of substitute products to number of specified materials.

4. Bind submittal in booklet form.

5. Submit manufacturers' certification that equipment meets or exceeds the minimum requirements as specified.

6. Where materials, equipment and installations are specified to conform with societies or agencies such as ANSI, ASHRAE, SMACNA, etc., submit certification of such compliance.

7. The submittal shall be complete and with catalog data and information properly marked to show, among other things, material capacity and performance to meet capacities or performance as specified or indicated. Arrange the submittals in the same sequence as the specifications and reference in the upper right-hand corner, the particular specification provision for which each submittal is intended. Incomplete submittals will be rejected, unless prior approval for partial submittal has been obtained.

8. The Contractor is responsible for confirmation of code approval of material and equipment.

9. If the Contractor submits a product that is specified, a complete set of brochures, rating tables, etc., is still required for future reference.

10. Review of the submittal is only for general conformance with design concept of
project and general compliance with information given in the contract documents. The Contractor is responsible for confirmation and correlation of the dimensions, quantities and sizes, for information that pertains to fabrication methods or construction techniques, and for coordination of work of all trades. Deviations from drawings and specifications shall be clearly and completely indicated (by a separate letter) in the submittal.

11. For items, which are not manufactured, and which have to be specifically fabricated including drawings and typical duct construction and complicated portions of ductwork, six copies of shop drawings and detail description shall be submitted. Shop drawings shall be submitted with such promptness as to allow ample time for examination and any re-submittal.

D. For duct and piping shop drawing development, the contractor shall obtain the most current architectural, structural and electrical CAD files to be overlaid on to mechanical duct and piping shop drawings.

1.13 SUBSTITUTIONS:

A. Substitution of an article, device, product, material, fixture, form or type of construction, other than those specified by name, make or catalog number is not permitted before the bid date. The contractor awarded the project, may propose substitutions as part of the submittal package as value engineering items. Written approval cannot be finalized until submittals are examined and credit to the owner is established.

B. If the use of substituted equipment results in an increase in the cost, including the work of other trades, the Contractor shall be solely responsible for payment of said increase in cost.

1.14 GUARANTEE:

A. In addition to the guarantees required elsewhere, all work, materials and equipment provided under the mechanical sections shall be guaranteed for a period of one year from the date of acceptance of the work by the Owner. Should any trouble develop during this period due to defective materials or faulty workmanship, the Contractor shall immediately furnish all necessary labor and materials to correct the trouble without cost to the Owner. The Contractor, under this guarantee, shall be responsible for all damages to any part of the premises caused by equipment furnished under this section.

B. Furnish written certified guarantee, in acceptable form, to the Owner, against defective workmanship, materials and operating equipment. Further guarantee to rebalance and adjust entire system, or any part thereof as required for perfect operation for a period of at least one year after acceptance. Compressors shall have five-year warranty. Repair, replace and make satisfactorily operative any and all defective items and work, holding the Owner free from any cost and liability in connection therewith, for the term of the guarantee.

1.15 INTERRUPTION OF SERVICES:

A. Existing services required to stay in operation in areas not remodeled shall be maintained rerouted or otherwise provided with temporary connection to prevent interruptions.
B. If impossible to prevent interruptions, they shall be performed during "off-hours" and coordinated with the Owner's Representative.

C. Provide a minimum of seven (7) days written notice of interruption. Do not interrupt services without written consent of the Owner.

1.16 DAMAGE BY LEAKS:

The Contractor shall be responsible for damage to the grounds, walks, roads, buildings, furnishings, piping systems, electrical systems and their equipment and contents, caused by leaks in the piping systems being installed or having been installed herein. They shall repair at their expense all damage so caused.

1.17 EMERGENCY REPAIRS:

The Owner reserves the right to make emergency repairs as required to keep equipment in operation without voiding the Contractor's guarantee bond nor relieving the Contractor of his responsibilities.

1.18 DEMOLITION:

A. Demolition, capping and rerouting shall be performed as shown and as required to accommodate new construction.

PART 2 – PRODUCTS

The specification of the mechanical products is detailed in the individual specification sections of Division 15.

PART 3 – EXECUTION

3.1 INSTALLATION INSTRUCTIONS:

A. The requirements of "mechanical" installation is detailed in the individual specification sections of Division 15. In addition, the following general requirements shall apply:

1. Obtain Manufacturer's printed installation instruction to aid in properly executing work of installing equipment whenever such instructions are available. Submit three copies of such instructions to the Architect prior to time of installation for use of supervising the work.

2. Erect equipment in a neat and workmanlike manner. Align, level and adjust for satisfactory operation. Install so that connecting and disconnecting of piping and accessories can be made readily, and so that all parts are easily accessible for inspection, operation, maintenance and repair. Minor deviation from arrangements shown on drawings may be made, as approved by the Architect.

3.2 PROTECTION OF AIR HANDLING SYSTEMS:

A. The Contractor shall continuously maintain adequate protection to keep dirt and foreign matter from getting into the air handling system.

B. Ductwork shall not be left open for any extended period of time. Open section and open fittings shall be capped wherever they occur until such time as final connections are
made to equipment, grilles, register, etc.

3.3 PROTECTION OF ELECTRICAL SYSTEMS:

Do not route liquid filled pressure and drain piping over electrical equipment, switchboards motor control centers and the like. When unavoidable, install galvanized drain pans to prevent liquid from dripping or squirting onto such equipment.

3.4 RECORD DRAWINGS:

A. The Contractor shall keep an accurate dimensional record of the as-built locations of all work under this Contract. This record shall be kept up-to-date at all times on blue line prints as the job progresses and shall be available for inspection at all times.

B. Upon completion of the work, obtain from the Architect one complete set of reproducible prints of the applicable Contract Documents. Record all changes and information contained on the Record Drawings onto the new set of reproducible prints in an orderly and legible manner.

C. Submit two blueline prints of the completed reproducible Record Set for approval. Make such changes and correction as may be required for final approval.

D. When final approval is received, sign the reproducible Record Set and stamp or note "As-Built" and submit to the Architect.

E. Final observation will not be made until these approved as-built drawings have been received by the Architect.

3.5 CUTTING AND PATCHING:

A. Perform all cutting and fitting required for work of this Section in rough construction of the building.

B. All patching of finished construction of building shall be performed under the section of specification covering these materials.

C. All cutting of concrete work by this Contractor shall be by core drilling or concrete sawing. No cutting or coring shall be done without first obtaining the permission of the Architect.

D. Information regarding requirements for openings, recesses, chases in the walls, partitions, framing or openings shall be provided for work under the appropriate sections of the specifications in advance of the work. Should this be neglected, delayed or incorrect and additional cutting is found to be required, this work shall be accomplished at no additional cost to the Owner.

E. All access panels shall be approved by the Architect as to location, appearance, and finish.

3.6 VIBRATION ELIMINATION AND CONNECTORS:

Rotating or reciprocating mechanical equipment shall be mounted on or suspended from vibration isolators to prevent vibration and structural borne noise transmission to the building. Refer to each mechanical trade section of these specifications for specific
details. Flexible duct connection shall be used between all fan openings and sheet metal work. Flexible connectors shall be used in piping connections to rotating or reciprocating equipment. See individual mechanical sections for specifications.

3.7 REQUIREMENTS FOR FINAL INSPECTION:

A. All of the following items must be completed prior to final inspections. No exception and no final payment will be made until all items are completed and approved. For specific requirements see the individual section in the Division 15 Category.

1. Cleaning equipment and premises
2. Test and balance of systems
3. Test and balance reports are reviewed by the Engineer
4. Service manual
5. Operation tests
6. Operating instructions
7. As-built drawings

3.8 EARTHQUAKE RESTRAINT:

A. General:

B. All earthquake resistant designs for mechanical equipment, such as motors and ductwork shall conform to the regulations of the California Building Code.

C. The restraints which are used to prevent disruption of the function of the piece of equipment because of the application of the horizontal force shall be such that the forces are carried to the frame of the structure in such a way that the frame will not be deflected when the apparatus is attached to a mounting base and equipment pad, or to the structure in the normal way, utilizing the attachments provided. Equipment, piping, ductwork, etc. shall be secured to withstand a force in any direction equal to the value shown in Table 16 of UBC.

3.9 ADJUSTMENTS OF SYSTEMS AND OPERATION TESTS:

A. When the work included in these specifications is complete, and at such time as directed by the Architect, the Contractor shall adjust all parts of the systems, advising the Architect when this has been done and the work is ready for their final tests. Refer to "Balancing and Testing Procedures" in Section 15800.

B. The Owner may require operation of parts or all of the systems prior to final acceptance. If it becomes necessary for temporary use of the systems before all parts are complete, the Contractor shall adjust all parts as far as possible in order to make such temporary use as effective as possible. After temporary use and before acceptance tests, all systems shall be readjusted to meet permanent operational requirements. This occupancy shall not be construed as final acceptance cost of utilities for such operation will be paid by the Owner.
C. Operation Test:

1. At completion, the Contractor shall operate all mechanical systems for a period of at least one eight-hour day(s) to demonstrate fulfillment of the requirements of the contract. During this time, all adjustments shall be made to the equipment until the entire system is in satisfactory operating condition acceptable to the Architect and the Owner.

2. Final Operation and Instruction: Upon completion of the installation of the equipment and after final acceptance, at a time approved by the Owner, the Contractor shall place a competent person at the building who shall operate the systems for a period of one eight-hour day(s) instructing the Owner’s Representatives in all details of operation and maintenance.

3. Any required instructions from manufacturer’s representatives shall be given during this period. The one day specified under “Operation Test” does not substitute for this day of final operation and instruction.

4. All arrangements for operation periods shall be made through the Owner, and the Architect.

D. For specific requirements see individual Mechanical Sections.

3.10 RUBBISH REMOVAL AND CLEANING:

Upon completion of the work under this section, the Contractor shall remove all surplus materials, equipment and debris incidental to their work, and leave the premises clean and orderly.

3.11 SERVICE:

Ninety (90) days free service shall be provided after completion of the job including changing of filters. Replacement filters shall be provided by the Owner and shall be on the job site.

3.12 PAINTING:

A. Excepting piping identification specified in the specific section all painting is specified in the Painting Section of the Specifications.

B. Surfaces to be painted shall be cleaned of cement, plaster and other spills.

C. Factory finishes shall be repaired to original condition when scratched or dented.

~~~END OF SECTION~~~
SECTION 15800  HEATING, VENTILATING AND AIR CONDITIONING

PART I - GENERAL

1.1 SUMMARY

A. The responsibilities of the Contractor shall include the following systems and equipment complete, and any additional work shown on the drawings or hereinafter specified.

   Exhaust Fans
   Ductwork
   Duct Insulation
   Air Distribution
   Vibration Isolation
   Automatic Temperature Control
   Test and Balance

B. The Contractor shall provide all sheet metal work as shown on the drawings or as required for the mechanical systems. Sheet metal work shall be as specified in this section.

1.2 GENERAL REQUIREMENTS:

A. Reference to Other Sections: The applicable requirements from the following sections shall form a part of the heating, ventilating and air conditioning work and the Contractor shall consult them in detail for general and specific requirements.

   Section 15050  General Mechanical Provisions

1.3 RELATED WORK:

A. The following work will not be furnished under this section of the specifications but will be furnished by other trades.

   1. Power voltage wiring and connections thereto and all power voltage conduit.
   2. Openings in walls, floor, roofs.
   3. Louvers in doors.
   4. Cutting, patching and furring.
   5. Flashing.
   6. Final painting.

1.4 SHOP DRAWINGS:

A. Submit for approval, installation drawings which show exact dimensions and locations of openings required in floors, roofs and walls for ducts, air intakes and exhaust, roof exhausters, piping etc.
B. For duct and piping shop drawing development, the contractor shall obtain the most the current architectural, structural and electrical Revit files to be overlaid on to mechanical duct and piping shop drawings.

1.5 FILTERS:

A. A complete set of filters shall be supplied for use during the construction, testing and balancing period. A complete set of new filters shall be installed after testing and balancing in F.C. No. 2.

PART 2 - PRODUCTS

2.1 DUCTWORK AND ACCESSORIES:

A. Supply ducts, return ducts, and exhaust ducts, plenum chambers, housing, panels, unless otherwise specified herein or on the drawings, shall be fabricated from zinc-coated (galvanized) steel sheets conforming to the latest ASTM specification A-653. Zinc-coating shall be of the “Commercial” class. Where gauge numbers of metals are indicated or specified, they shall represent the manufacturer's standard gauge numbers, prior to galvanizing.

B. Exposed Ductwork: All exposed ductwork shall be free from dings and dents. All rectangular and round ductwork shall have Ductmate System connections. All exposed round ducts shall be spiral type duct and shall be installed so seams line up at connections to appear as a single duct run. All exposed ductwork shall be supported using threaded rods. Sheet metal straps are not acceptable. All exposed duct fittings (i.e., elbows, branch tees, etc.) shall be two gages heavier than the duct they are connected to.

C. Volume Dampers:

1. Damper blades shall be manufactured of 16-gauge sheet metal.

2. Rectangular dampers shall be opposed blade type. Frame shall be 16-gauge galvanized steel. Where dimensions of duct exceed 18” x 12”, blades shall not be over 8” wide. Bearings shall be provided; holes punched in ductwork to serve as bearings will not be accepted. Locking quadrant sizes shall be as follows: Up to 40 square-inches shall be 1/41 quadrant; up to 18” x 12” shall be % “quadrant, and over 18” x 12” shall be 1/2, quadrant.

3. Round dampers up to 9” diameter may be installed in sheet metal spin fittings when used for balancing air distribution devices. Frames for dampers 10” diameter and above shall be 16-gauge galvanized steel. Dampers above 20” diameter shall be reinforced. Quadrant sizes shall be as follows: up to 9” diameter shall be ¼ quadrant, 10” through 20” diameter shall be ‘quadrant, and over 20” diameter shall be % “quadrant.
D. **Flexible Connectors:** Furnish and install connections at the point where ductwork casing connects to fans, and where shown on the drawings. Connectors shall be manufactured by Duro Dyne. Indoor flexible connectors shall be Noeprene #10003 MFN metal fab. Outdoor flexible connectors shall be Durolon #10002 MFD metal fab. Connectors shall be securely clamped to ductwork, fans and apparatus by means of bolted metal straps.

E. **Flexible Ducts:**

1. Flexible ducts shall consist of an exterior reinforced laminated vapor barrier, 1 1/2" thick fiberglass insulation (K = .25 ~ 75°F), encapsulated spring steel wire Helix and impervious smooth, non-perforated interior vinyl liner. Individual lengths of flexible ducts shall contain factory fabricated steel connection collars.

2. Flexible ducts shall be supported at or near mid-length with 2" wide, 28-gauge steel collar attached to the structure with an approved duct hanger. Installation shall minimize sharp radius turns or offsets. The maximum length shall be 5 feet and can be used at the terminal ends only, except that flexible ducts may be used to cross seismic joints without offsets.

3. Insulated low pressure flexible duct shall be Thermaflex MKE or approved equal.

2.2 **INSULATION:**

A. Install thermal insulation on clean, dry surfaces after testing, inspection, and approval in strict accordance with these specifications, applicable drawings and contract documents and manufacturers’ recommendations. Except for materials listed below, all insulation and accessory materials are to meet NFPA requirement of flame spread not to exceed 25 and smoke developed not to exceed 50 as tested by Procedure ASTM-E-84, NFPA 225, or UL 723.

1. Excepted are:

   a. Flexible, closed cell foamed plastic insulation (Armacell or approved equal) on water chilling units, copper tubing refrigerant piping, copper tubing runouts and drain lines only.

   b. 8 oz. canvas jacket on exposed ductwork and equipment only.

B. **Duct Insulation:** Insulate all concealed supply and return air ducts with flexible glass fiber insulation with factory applied reinforced foil kraft facing, Manville R-series Microlite FSKL or approved equal. 1½" minimum thickness, density 2.0 pcf. Installed “R” value of 4.2 in conditioned space and 8.0 in non-conditioned space.

C. **Duct Liner:** Ducts, where shown on the drawings shall be lined with 1½” minimum thickness, density 2.0 pcf, Manville “Linacoustic” or approved equal. The insulation shall not exceed k = .28 at 75°F mean temperature, installed R-value shall be 4.2 in conditioned space and 8.0 in non-conditioned space.
2.3 EQUIPMENT:

A. Ceiling Exhaust Fans:

1. Ventilator shall have steel housing finished in baked enamel and insulated with at least 1/2" acoustic insulation. Housing shall have adjustable mounting brackets.

2. Automatic Backdraft Damper shall be located within duct connector and shall have cushioned stops to prevent clatter. Damper/duct connector and wiring adapter plate shall be adjustable for either horizontal or vertical installation.

3. Blower shall be removable and shall have a centrifugal blower type wheel. All motors are to be lifetime lubricated type, mounted with neoprene torsion mounts to isolate vibration. RPM not to exceed number listed for each model.

4. Air Delivery shall be no less and sound levels no greater than listed for each model. All air and sound ratings shall be certified by AMCA. Units shall be UL listed.

2.4 AIR DISTRIBUTION:

A. Performance: Shall provide the required air throw and spread with no apparent drafts or excessive air movement within the air-conditioned area. Any air distribution accessories required to affect these conditions shall be provided and installed by the Contractor. Grilles, registers or ceiling diffusers causing excessive air movement, drafts or objectionable noise, shall be replaced at no cost to the Owner. Paint inside of all ducts including volume dampers, etc., behind registers and diffusers with two coats flat black enamel.

B. Locations: All devices shall be installed in approximately the location indicated on the drawings, but the Contractor shall verify the exact locations at the building, and with the drawings, making any minor changes as may be required and as approved by the Owner.

C. Air Distribution shall be “Titus” Manufacture of the model numbers listed, Metal Aire or Krueger.

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<td>Ceiling Diffusers:</td>
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<td>Return Registers:</td>
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2.5 AUTOMATIC TEMPERATURE CONTROL:

A. Summary: The temperature control manufacturer as described under this heading shall furnish and install a complete system of automatic controls as
shown on plans and as specified hereinafter. All control equipment shall be the product of one manufacturer and shall be basically of the electric type. The control manufacturer shall have a representative sample of local jobs to validate performance and shall have a maintained a full-time local service organization for at least three years.

B. Electrical Wiring: See paragraph 3.6 of this section.

C. Smoke Detectors:
   1. The air duct smoke detector shall be of the photoelectronic type.
   2. The detector housing shall be California State Fire Marshall listed (CASFM) and UL listed per UL268A, specifically for use in air handling systems.
   3. The detector shall operate at air velocities of 100' per minute to 4,000' per minute.
   4. The detector shall be capable of local reset button or remote test switch (RTS).
   5. The duct detector housing shall incorporate an airtight smoke chamber in compliance with UL268A, Standard for Smoke Detectors for Duct Applications.
   6. The housing shall be capable of mounting to either rectangular or round ducts without adaptor brackets.
   7. An integral filter system shall be included to reduce dust and residue effects on the detector and housing, thereby, reducing maintenance and servicing.
   8. Sampling tubes shall be either be plastic or be able to be installed after the housing is mounted to the duct by passing through the duct housing.
   9. The enclosure shall meet all applicable NEC and NFPA standards regarding the electrical junction boxes. Terminal connections shall be a strip and clamp method that is suitable for 12-18 AWG wiring.

PART 3 - EXECUTION

3.1 DUCTWORK:

   A. Ductwork fabrication and installation shall conform to the recommendation of the latest edition of the duct construction standards as published by the Sheet Metal and Air conditioning Contractors National Association, Inc., (SMACNA). These standards shall govern type of seams and joints, reinforcing and supports, corner closures duct hangers, elbows, turning vanes (use double vane type), tapers offsets; streamliners, branches from mains, tee connections, volume dampers, access doors in ducts, fire damper installation, casings and housing. All unwrapped exposed ducts shall be cross-broken; beading will not be acceptable. Ducts that are wrapped shall be cross-broken or beaded.

   B. Volume dampers shall be caulked in the ducts to avoid bypass. Damper blade position on all dampers shall be indicated by filing a notch in the exposed operation rod or splitter damper rod. Volume control dampers shall be installed in
all branch ducts, whether shown on drawings or not, to allow balancing of the system. Where damper frames and blades constitute an obstruction in excess of 15 percent of the duct area, the duct shall be increased in size to receive the damper.

C. All supply, return, and exhaust duct joints shall be sealed airtight with approved mastic.

D. All duct seams and joints exposed to weather shall be caulked watertight with acrylic sealant and shall have 4-inch minimum width of 6-ounce canvas pasted on with lagging adhesive.

3.2 INSULATION INSTALLATION:

A. Insulate no piping or equipment until tested and approved for tightness. All piping shall be dry when insulated.

B. Ductwork Insulation:

1. Supply Air Ductwork Above Ceiling: Secure insulation to duct with mechanical fasteners on 18” centers or on underside of rectangular ducts over 30” wide. Seal all joints, fastener penetrations and other breaks in vapor barrier with 3” wide strips of the same facing material adhered with vapor barrier adhesive, Manville Z-Glue or approved equal, or 3” wide strips of white glass fabric, Manville Duramesh Fabric No. 206 or approved equal, coated with vapor barrier mastic, Foster 30-35 or approved equal.

2. Return Air Ductwork Above Ceiling: The insulation shall be wrapped entirely around the duct with all joints lapped at least 2” and secured with 16 gauge galvanized wire on 12” centers. The insulation shall cover all surfaces including standing seams.

3. Ductwork Liner: The duct liner shall be applied with 100% coverage of approved fire-resistant adhesive. On ducts over 20” wide or deep, the liner shall be additionally secured with mechanical fasteners on maximum 15” centers. Fasteners shall start within 2” of the leading edge of each section and within the duct section. All exposed edges and the leading edge of all cross joints of the liner shall be heavily coated with an approved fire-resistant adhesive. The duct liner shall be cut to assure snug closing corner joints, the black surface of the liner shall face the air stream, transverse joints shall be neatly butted, and all damaged areas shall be heavily coated with an approved adhesive.

3.3 EQUIPMENT INSTALLATION:

A. The installation of all air conditioning equipment and exhaust fans shall be strictly in accordance with the manufacturer’s instruction and installation book. All recommendations of manufacturer shall be followed, required clearances maintained, and factory approval secured for each installation. All equipment shall be securely fastened to its base. All parts of the installation shall be made weatherproof. A copy of the manufacturer’s installation and service manual shall
be kept with each piece of equipment at all times to allow an inspector to
determine if the installation meets requirements.

B. All work shall be performed by skilled mechanics, under the supervision of a
competent foreman and in accordance with the best standards of practice of the
trade.

3.4 WALL PENETRATIONS:

A. All penetrations of exterior walls shall be flashed watertight with lead or
galvanized iron.

B. Flashing shall comply with architectural requirements to ensure a watertight seal.

C. Pipe flashing shall be counterflashing sleeve type with 4-pound seamless lead
flashing with 8” skirt. The joint shall be sealed with Permaseal water-proofing
compound or equal.

3.5 IDENTIFICATION OF MECHANICAL EQUIPMENT:

A. Equipment: Equipment shall be identified by stenciling the identification plainly
(such as EF-1 as shown on equipment schedule) on the service side. Lettering to
be minimum size of 1”. This applies to fans, boiler, etc.

3.6 ELECTRICAL WORK:

A. Power voltage wiring and connections thereto and all power voltage conduit shall
be furnished and installed per electrical requirements.

B. Low voltage and line voltage control wiring and connections thereto and all low
and line voltage control conduit shall be furnished and installed under the
Mechanical Sections of the specifications.

C. Relays, pushbutton stations, control equipment, etc., shall be furnished under the
Mechanical Section of the specifications, except as noted on the drawings. Check
drawings closely for starters that will be furnished under the Electrical Division which will be in Motor Control Panels. Magnetic motor starters will be
furnished under Mechanical Division.

D. Disconnect switches shall be furnished, installed and connected under the
Electrical Division of the specification.

3.7 EARTHQUAKE RESTRAINT:

A. Provide a means to prohibit excessive motion of all mechanical equipment during
an earthquake.

B. All mechanical equipment, both hanging and base mounted, shall be provided
with mounting connection points of sufficient strength to resist lateral seismic
forces equal to 0.5 of equipment operating weight.

3.8 SHOP PRIMING PROCEDURES:
A. Ferrous metal items, except items to be encased in concrete and areas adjacent to field welds shall be thoroughly cleaned and prime painted.

B. Surfaces shall be cleaned free of loose mill scale, loose rust, accessible weld slag or flux deposit, dirt and other foreign matter by hand wire brushing. Oil and grease deposits shall be removed by solvent.

C. After cleaning, surfaces shall be given one shop coat of prime paint applied thoroughly and evenly to dry surfaces. Surfaces inaccessible after assembly or erection shall be given an additional shop coat of slightly different color than first coat.

D. After erection, rough up with prime paint all members where shop coat has been damaged, welds and area adjacent to welds and field bolts.

3.9 TEST AND BALANCE:

A. The Contractor shall furnish all labor, equipment and services necessary for and incidental to air and water systems testing and balancing.

B. Include an extended warranty of one year after final acceptance by Owner, during which time the Owner may request a recheck or resetting of any outlet, coil or device listed in the test report. Provide technicians to assist in making any test or adjustment required.

C. Contractor shall at his own expense, procure the service of an independent air balance and testing agency approved by the Owner, which specializes in the balancing and testing of heating, air conditioning and ventilating systems, to balance, adjust and test all air moving equipment, air distribution systems and exhausting systems as herein specified. All instruments used by this agency shall be accurately calibrated and maintained in good working order. If requested, the test shall be conducted in the presence of the Owner and/or his representative.

D. Air balance and testing shall not begin until system has been completed and is in full working order. The Contractor shall put all heating, ventilating and air conditioning systems and equipment in full operation and shall continue the operation of same during each working day of testing and balancing. The Contractor shall submit, within fifteen (15) days after receipt of Contract, one copy of submittal data for the testing and balancing of the air conditioning, heating and ventilating systems. The air balance agency shall provide proof of having successfully completed at least five projects of similar size and scope and shall be a certified member of the Associated Air Balance Council and/or National Environmental Balancing Bureau and/or Testing Adjusting & Balancing Bureau (TABB) unless otherwise approved.

E. Test and balance agency shall include an extended warranty of ninety (90) days after completion of test and balancing work, during which time the Owner, at his discretion, may request a recheck or resetting of any outlet, supply air fan, or exhaust fan as listed in test report. The agency shall provide technicians to assist the Engineer in making any test he may require during this period of time. Commissioning agent shall conduct "spot checks" on air distribution to verify air
balancing.

F. The Air Conditioning Contractor shall award the test and balance Contract to the approved agency upon receipt of his Contract to proceed with air conditioning installation, to allow the air balance agency to schedule this work in cooperation with other trades involved and comply with the completion date.

G. Upon completion of the air conditioning system, the air balance agency shall perform the tests, compile the test data, and submit six copies of the complete test data to the Contractor for forwarding to the Owners for evaluation and approval.

3.10 OPERATING AND MAINTENANCE MANUALS:

A. The Contractor shall furnish three Operating and Maintenance Manuals. The information in these manuals shall be bound in a hardback, loose-leaf binder or approved equivalent. The following shall be inscribed on the cover: the words “OPERATING AND MAINTENANCE MANUAL,” the name and location of the building or project, and the name of the Contractor. The following shall be included in the Manual:

1. Identification: The Manual shall include the names, addresses and telephone numbers of each Sub-Contractor installing equipment and systems and of the local representative for each major item of equipment.

2. Index: The Manual shall have a Table of Contents and information shall be assembled with tab sheets to conform to the Table of Contents.

3.11 OPERATING AND MAINTENANCE INSTRUCTIONS:

A. Manufacturer’s Literature: Manufacturer’s instructions for operation and maintenance of all mechanical equipment, including replacement parts list.

B. Written Instruction: Printed instructions for operation and maintenance of the system composed of Operation Instruction, Maintenance Instructions and Maintenance Schedule.

C. Operation and Maintenance Instructions: A brief description of the system indicating proper setting of switches and other equipment shall be furnished for the purpose of providing control of the system and its components by the operator.

~~~END OF SECTION~~~
SECTION 16519
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY
   A. This Section includes the following:
      1. Building and Exterior wires and cables rated 600 V and less.
      2. Connectors, splices, and terminations rated 600 V and less.

1.2 ACTION SUBMITTALS
   A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS
   A. Field quality-control test reports.

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

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES
   A. Copper Conductors: Comply with NEMA WC 70.
   B. Conductor Insulation: Comply with NEMA WC 70 for specified types herein.
   C. Multiconductor Cable: Not allowed.

2.2 CONNECTORS AND SPLICES
   A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering
      products that may be incorporated into the Work include, but are not limited to, the following:
B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.
6. Or equal.

C. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

D. All cables shall arrive on the job site in un-broken packages.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Copper conductors: Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Insulation: Thermoplastic type THWN or THHN. Use conductors with 150 degrees C insulation in abnormally high ambient temperatures as applicable. Type THHN may be used in dry locations.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. All conductors are to be installed in conduit/raceways.

B. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

F. Identify and color-code conductors and cables according to Division 16 Section "Identification for Electrical Systems."

G. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
H. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

3.4 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS & FIRESTOPPING

A. Provide sleeves for conduits passing through poured concrete walls and concrete or concrete fireproofed steel beams. Provide 18 gauge galvanized steel and place in correct position in forms before concrete is poured. Sleeve shall be at least ½” above finished floor all around. Pack void between sleeve and conduit as follows:

1. Where conduit is run between floors in a fireproof shaft, pack with Duxseal
2. Where conduit penetrates a fire separation, any of the following packing methods may be used to restore integrity of the separation if code approved: cement, mineral fiber sprayed with flame retardant coating or Dow Corning 3—6548 RTV silicon foam, 3M caulk #CP25, 3M putty #303 or equal. Seal shall be water tight and shall be accomplished prior to wire pulling.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.

C. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION
PART 1 - GENERAL

1.1 SUMMARY
   A. Section Includes: Grounding systems and equipment.

1.2 SUBMITTALS
   A. Product Data: For each type of product indicated.
   B. Field quality-control reports.

1.3 QUALITY ASSURANCE
   A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS
   A. Insulated Conductors: **Copper only** wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
   B. Bare Copper Conductors:

2.2 CONNECTORS
   A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
   B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.
      1. Pipe Connectors: Compression type, sized for pipe.
C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper 3/4 inch in diameter by 10 feet long minimum.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.

B. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.

C. Conductor Terminations and Connections:
   1. Welded connectors
   2. Bolted connectors

3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors in all circuit runs, in addition to those required by NFPA 70

B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

D. Signal and Communication Equipment: In addition to grounding and bonding required by NFPA 70, provide a separate grounding system complying with requirements in TIA/ATIS J-STD-607-A.

   1. For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG unless otherwise noted insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
   2. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-4-by-12-inch grounding bus.
   3. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
E. **Metal** Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.
   1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.

C. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 26 Section "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches deep, with cover.
   1. Test Wells: Install at least one test well for each service unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.

D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
   1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
   2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
   3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.

E. Grounding and Bonding for Piping:
   1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
   2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
   3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

F. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.
3.4 LABELING

A. Comply with requirements in Division 16 Section "Identification for Electrical Systems" Article for instruction signs. The label or its text shall be green.

B. Install labels at the telecommunications bonding conductor and grounding equalizer and at the grounding electrode conductor where exposed.

3.5 FIELD QUALITY CONTROL

A. Perform the following tests and inspections and prepare test reports:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Make tests at ground rods before any conductors are connected.

B. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: **10** ohms.
2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: **5** ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: **3** ohms.
4. Power Distribution Units or Panelboards Serving Electronic Equipment: **1** ohm(s).

C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify electrical engineer of record promptly. Provide at notification alternate method of reducing ground resistance below the above noted compliant values.

END OF SECTION
SECTION 16533
RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY
A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
B. See Division 26 Section "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks and manholes, and underground handholes, boxes, and utility construction.

1.2 SUBMITTALS
A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, details, and attachments to other work.

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

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING
A. Rigid Steel Conduit: ANSI C80.1.
B. IMC: ANSI C80.6.
C. EMT: ANSI C80.3.
D. FMC: Zinc-coated steel.
E. LFMC: Flexible steel conduit with PVC jacket.
F. Fittings for Conduit (Including all Types and Flexible and Liquid tight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
2. Fittings for EMT: compression type.

2.2 NONMETALLIC CONDUIT AND TUBING

B. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.
C. LFNC: UL 1660.
D. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.
E. Fittings for LFNC: UL 514B.

2.3 METAL WIREWAYS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   1. Cooper B-Line, Inc.
   2. Hoffman.
   3. Square D; Schneider Electric.
   4. Or equal

C. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, 12 or 3R, as indicated.

D. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

E. Wireway Covers: As indicated.

F. Finish: Manufacturer's standard enamel finish.

2.4 NONMETALLIC WIREWAYS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   1. Hoffman.
   2. Lamson & Sessions; Carlon Electrical Products.
   3. Or equal
C. Description: PVC plastic, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.

D. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

2.5 SURFACE RACEWAYS

A. Surface Metal Raceways: Galvanized steel. Manufacturer's standard enamel finish or in color selected by Architect per drawings.

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. Thomas & Betts Corporation.
   c. Wiremold Company (The); Electrical Sales Division.
   d. Or equal.

B. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC with texture and color selected by Architect.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Butler Manufacturing Company; Walker Division.
   b. Enduro Systems, Inc.; Composite Products Division.
   c. Hubbell Incorporated; Wiring Device-Kellems Division.
   d. Lamson & Sessions; Carlon Electrical Products.
   e. Panduit Corp.
   g. Wiremold Company (The); Electrical Sales Division.
   h. Or equal.

2.6 BOXES, ENCLOSURES, AND CABINETS

A. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

C. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

D. Metal Floor Boxes: Cast metal, fully adjustable.

E. Nonmetallic Floor Boxes: Nonadjustable, round.

F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
G. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, **cast aluminum** with gasketed cover.

H. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer’s standard enamel.
2. Nonmetallic Enclosures: PVC.

I. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer’s standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: **Rigid steel conduit**, EMT, RNC, Type EPC-40-PVC, RNC, Type EPC-80-PVC.
2. Concealed Conduit, Aboveground: **Rigid steel conduit**, EMT, RNC.
3. Underground Conduit: Type EPC-40 or 80-PVC, direct buried.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC or LFNC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R or 4X as noted.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT or rigid steel conduit.
2. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Includes raceways in the following locations:
   a. Loading dock.
   b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
   c. Mechanical rooms.
3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
5. Damp or Wet Locations: Rigid steel conduit.
6. Raceways for Optical Fiber or Communications Cable: EMT.
7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4X in damp or wet locations.

C. Minimum Raceway Size: **1/2-inch** trade size.
D. Raceway Fittings: Compatible with raceways and suitable for use and location.
   1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.2 INSTALLATION

A. Conduit passing through roof: flash and counter flash. Method shall be compatible with roofing system and acceptable to the owner’s representative.

B. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

C. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

D. Complete raceway installation before starting conductor installation.

E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
   1. Conduit shall not be imbedded in slabs on grade.

H. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating sealing bushings to protect conductors, including conductors smaller than No. 4 AWG.

I. All conduit stubs shall have insulated bushings.

J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull rope.

K. Raceways for Optical Fiber and Communications Cable: Install as follows:
   1. 3/4-Inch Trade Size: Install raceways in maximum lengths of 50 feet.
   2. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.
   3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

L. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
   1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
   2. Where otherwise required by NFPA 70.
M. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.

1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:
   a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
   b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
   c. Indoor Spaces Connected with the Outdoors without Physical Separation: 125 deg F temperature change.
   d. Attics: 135 deg F temperature change.

2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.

3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.

N. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

O. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

P. Set metal floor boxes level and flush with finished floor surface.

Q. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Division 31 Section "Earth Moving."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."
4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.
a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

6. Warning Planks: Bury warning tape approximately 12 inches above direct-buried conduits, placing them 24 inches o.c. Align tape along the width and along the centerline of conduit.

B. Bury underground conduit (except under building) to a 24” minimum depth below finished grade to top of conduit or concrete envelope (when encased) except that for conduit below a road or driveway to dimension shall me a 30” minimum.

1. All conduit risers from below grade shall be PVC schedule 80 with the exception of risers to lighting pole may be PVC schedule 40.

3.4 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

END OF SECTION
SECTION 16553
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY
A. Section Includes:
   1. Identification for raceways.
   2. Identification of power and control cables.
   3. Identification for conductors.
   5. Warning labels and signs.
   6. Instruction signs.
   7. Equipment identification labels.
   8. Miscellaneous identification products.

1.2 SUBMITTALS
A. Product Data: For each electrical identification product indicated.

1.3 QUALITY ASSURANCE
A. Comply with ANSI A13.1.
B. Comply with NFPA 70.
D. Comply with ANSI Z535.4 for safety signs and labels.
E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

PART 2 - PRODUCTS

2.1 POWER RACEWAY IDENTIFICATION MATERIALS
A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
B. Colors for Raceways Carrying Circuits at 600 V or Less:
   1. White letters on a black field.
2. Legend: Indicate voltage and system or service type.

C. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

D. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

F. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.

   1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

   2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.2 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.

B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.

   1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

   2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

D. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

E. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

2.3 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

C. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

D. Write-On Tags: Polyester tag, 0.015 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
   1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
   2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.4 FLOOR MARKING TAPE

A. 2-inch- wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

2.5 UNDERGROUND-LINE WARNING TAPE

A. Tape:
   1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
   2. Printing on tape shall be permanent and shall not be damaged by burial operations.
   3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:
   1. Comply with ANSI Z535.1 through ANSI Z535.5.
   2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.
   3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.

C. Tag: Type I:
   1. Pigmented polyolefin, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
   2. Thickness: 4 mils.
   3. Weight: 18.5 lb/1000 sq. ft.
   4. 3-Inch Tensile According to ASTM D 882: 30 lbf, and 2500 psi.

D. Tag: Type II:
   1. Detectable three-layer laminate, consisting of a printed pigmented polyolefin film, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core, bright-colored, continuous-printed on one side with the inscription of the utility, compounded for direct-burial service.
   2. Overall Thickness: 5 mils.
3. Foil Core Thickness: 0.35 mil.
5. 3-Inch Tensile According to ASTM D 882: 70 lbf, and 4600 psi.

2.6 WARNING LABELS AND SIGNS


B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Baked-Enamel Warning Signs:
   1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
   2. 1/4-inch grommets in corners for mounting.
   3. Nominal size, 7 by 10 inches.

D. Metal-Backed, Butyrate Warning Signs:
   1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
   2. 1/4-inch grommets in corners for mounting.
   3. Nominal size, 10 by 14 inches.

E. Warning label and sign shall include, but are not limited to, the following legends:
   1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
   2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

2.7 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.
   1. Engraved legend with White letters on black face.
   2. Punched or drilled for mechanical fasteners.
   3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.

C. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.
2.8 EQUIPMENT IDENTIFICATION LABELS

A. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

B. Self-tapping, stainless-steel machine screws (no rivets or glue), Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

2.9 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in Division 09 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Apply identification devices to surfaces that require finish after completing finish work.

C. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

E. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

F. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.

G. Painted Identification: Comply with requirements in Division 09 painting Sections for surface preparation and paint application.
3.2 IDENTIFICATION SCHEDULE

A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 20A, and 120 V to ground: Install labels at 10-foot maximum intervals.

B. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:

2. Power.
3. UPS.

C. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.
   a. Color shall be factory applied.
   b. Colors for 208/120-V Circuits:
      1) Phase A: Black.
      2) Phase B: Red.
      3) Phase C: Blue.
   c. Colors for 480/277-V Circuits:
      1) Phase A: Brown.
      2) Phase B: Orange.
      3) Phase C: Yellow.
   d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

D. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.

E. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.

F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.

G. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
1. Limit use of underground-line warning tape to direct-buried cables.
2. Install underground-line warning tape for both direct-buried cables and cables in raceway.

H. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.

I. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Baked-enamel warning signs.

2. Identify system voltage with black letters on an orange background.
3. Apply to exterior of door, cover, or other access.
4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
   a. Power transfer switches.
   b. Controls with external control power connections.

J. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

K. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for power transfer.

L. Equipment Identification Labels: Unless otherwise noted, equipment identified in place shall be affixed in self tapping machine screws. On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:
   a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.
   b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
   c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
   d. Fasten all equipment labels that do not

END OF SECTION
SECTION 16600
LIGHTING

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Provide U.L. listed lighting fixtures complete with lamps at light outlets indicated on the drawings. Each fixture shall bear the U.L. Label, and shall comply with Code Requirements. Exterior fixtures shall be U.L. approved for the location and shall be so labeled.

B. Fixtures are listed and described in the Fixture Schedule and in the following paragraphs. Fixture catalog numbers are to be used as a guide only and be understood to be preceded by the words "similar to" and followed by the words "except as modified by the total fixture description both text and pictorial". Provide accessories, features and adaptations necessary to meet the requirements of the description.

C. If the fixture designation is omitted from a light outlet, assume a fixture of the type used in similar areas in preparing the Bid. Confirm type with Architect prior to ordering.

1.02 SUBMITTALS

A. Type written material list with all catalog numbers indexed to the drawings and specifications.

B. Catalog cuts of all lighting fixtures, ballasts, and lamps.

C. Shop Drawings

1.03 ACCEPTABLE MANUFACTURERS

A. Ballast: Advance, Valmont Electric, Jefferson, Universal, or Sola, unless specifically indicated.

B. Lamps: Sylvania, General Electric, N.A. Phillips or Venture, unless specifically indicated.

1.04 LAMP REPLACEMENT

A. Replace lamps which burn out after Owner’s use or acceptance of the project or of an area in the case of beneficial occupancy.

B. Lamps which burn out within 120 days.

PART 2 - PRODUCTS

2.01 GENERAL PRODUCTS REQUIREMENTS

A. Fixtures shall be complete with all required accessories and equipment, including lamps, necessary for a complete installation.
B. Fixtures and luminaires of one type shall be of one manufacturer and of identical finish and appearance. All lamps of the same type shall be by the same manufacturer.

C. Fixtures and trims shall be assembled and installed with care to avoid and eliminate light leaks. Where necessary, gasketing, patching, or other effective means shall be used. There shall be no entry for insects or dirt into any fixture.

D. Totally enclosed lamp compartments of HID luminaires located outside shall have activated charcoal filters to allow breathing without transfer of contaminants.

E. Verify the ceiling or wall construction, and the mounting requirements of each fixture and provide plaster frames, special flanges, concrete pour housings, boxes, brackets, adapters, hangers, stems, canopies, special ballasts or lenses, and other materials necessary to properly purchase and mount the fixture.

F. Four hanger wires shall be provided for each recessed troffer. Locate at diagonal corners.

G. Where required, all fixtures shall be provided with tamper resistant screw.

H. Submit shop drawings on all fixtures as required under "Submittals." "Shop drawings" may be catalog data sheets if complete information including mounting hardware is shown and identified. Shop drawings shall include mounting details and show compatibility with the ceiling, pole, bracket or other equipment.

I. Finish: Treat surface mounted fixtures and exposed trim of recessed fixtures with a rust-inhabitant process. This process shall be Bonderlite or Oakite Cryscoat or equal zinc phosphate bonding process. Refer to PAINT, FINISHES, AND COLORS Subsection.

J. Optical Systems: Lighting fixtures for use with MH lamps shall have the optical system specifically designed for a clear MH lamp of the wattage indicated.

K. Reflectors for multi-phosphorous lamps, including all compact fluorescent lamps, shall be low-iridescent finish to minimize rainbow effect on reflector.

L. Ballast Wiring: Where multiple level switching of fluorescent fixtures is indicated on the drawings, wire ballast for symmetrical grouping of lamps. For example in four lamp fixtures, two inner and two outer lamps shall be switch controlled. Two three-lamp fluorescent fixtures mounted end to end shall have the center lamps connected to one two-lamp ballast in either fixture.

M. Fixture Pendants: Pendant fixtures shall have metal stems. Non-metallic (cord type) stems will not be permitted. Where a pendant fixture has a standard non-metallic stem, replace it with a metal stem before installation.

N. All pendant fixtures shall be supported by metal stems provided with ball swivel hangers at both ends of stems which permit lateral movement to 45 degrees maximum from the vertical. Provide a stainless steel safety cable inside of each stem securely attached to the fixture body and to the building structure independent of the outlet box.

2.02 LIGHT TRANSMITTING PLASTICS

A. All plastic shall be 100% virgin acrylic.
B. Pattern #12 lenses shall be minimum .125” thick overall with .08” prism depth.

C. Provide lenses for soffits and lighting coves according to the following schedule. Lens dimensions shall be selected based on actual dimensions of the installed soffit or cove.

1. 5/8" x 5/8" x 7/16" deep aluminum louver. A.L.P. series Para-Lite 2.

2. Locations: Soffits in all toilet rooms. See architectural drawings.

2.03 POLES

A. All poles shall be designed by the pole manufacturer to safely support the total Effective Projected Area (EPA) of luminaires, arms and accessories with a wind rating of 100 MPH with 1.3 gust factor.

2.04 BALLAST

A. Electronic Fluorescent Ballasts:

1. All ballasts shall be UL listed, Class P, High Power factor (above 90%), sound rated A and shall be warranted for a minimum of three years from date of installation, including a replacement labor allowance.

2. Ballast input wattage for a two lamp F032/T8/32 watt application shall be 58 watts or less.

B. Electronic Ballast:

1. Provide electronic ballasts in all fluorescent fixtures for which they are available. Electronic ballasts shall be high power factor, sound rated 'A', contain no PCB and be listed by U.L. Ballasts shall have fewer than 32 components and operate at 20 to 35 KHZ. Ballast shall be fully potted and within steel case, operating temperature of ballasts shall not exceed 80°C at any point on the case. Ballast shall be surge and transient protected to 6000 volts and shall comply with FCC or NEMA limits as to EMI or RFI and not interfere with the operation of other electrical equipment. Ballast shall carry a three year unconditional warranty for labor and materials. Ballasts shall be approved by the local utility company for energy rebates.

C. Emergency battery pack ballasts for fluorescent lighting fixtures shall consist of an automatic power failure device, single pole test switch, and fully automatic solid-state charge and indicator light in a self-contained power pack furnished by the fixture manufacturer as an integral part of the fixture. Electronic circuitry shall be self-testing in design and automatically test the unit every 30 days for 30 seconds, and initiate a 90 minute discharge test once a year. An embedded microcontroller will continually monitor battery charging current and voltage. Audible alarm and a light-emitting diode will be provided to indicate test results and status conditions. Charger shall be either trickle, float, constant current or constant potential type, or a combination of these. Battery shall be maintenance free nickel cadmium type with capacity to supply power to one or two lamps for each fixture in emergency mode for 90 minutes minimum with a light output of 1100 lumens minimum. Unit shall be capable of operating a dead fluorescent lamp.

D. Fluorescent and HID ballasts and emergency battery pack ballasts shall be guaranteed for three years.
2.05 LAMPS

A. Lamp wattage, type, color and style shall be as shown on the fixture schedule. All lamps of the same type shall be by the same manufacturer.

B. Fluorescent lamps shall be 32 watt, 2850 lumen energy saving type T8, 4100K or equal, unless noted otherwise in the fixture schedule.

C. H.I.D. lamps shall be by GE, Venture, Sylvania, or N.A. Phillips, Osram, Mercury lamps shall be color corrected. Metal halide lamps shall be specifically selected to provide a uniform match of lamp color appearance. The Architect shall be the judge of what constitutes reasonable uniformity of color.

2.06 ELECTRONIC TIME SWITCHES

A. Time switches shall be a Tork 7200KL or equal, 2-circuit programmable time control with the following features:

B. 365 day per year programming to control lighting circuits for daylight savings periods, 16 events per day, or 112 events per week per channel, power outage carryover powered by lithium battery.

C. Voltage shall be 277V.

2.07 LENSES

A. Light transmitting plastics:

1. All plastic shall be 100% virgin acrylic. Pattern #12 lenses shall be minimum .125" thick overall with .08" prism depth.

B. Glass:

1. Glass used for lenses, refractors, and diffusers in lighting fixtures shall be tempered for high impact and heat resistance; the glass shall be crystal clear in quality with a transmittance of not less than 88%. For exterior fixtures use tempered Borosilicate glass, Corning #7740 or equal. For fixtures directly exposed to the elements and aimed above the horizontal, use Corning Vycor glass or equal.

2.08 EMERGENCY/EGRESS FIXTURES

A. Exit Sign Fixtures:

1. Emergency exit sign fixtures with illumination by LED's (Light Emitting Diodes), providing even illumination of letters through an optical diffuser to meet or exceed requirements of NFPA Life Safety Code 101 UL-924, and the OSHA code. The power supply shall be dual input 120/277V 60 Hz. All components shall be solid state, with surge protection and short circuit protection and each LED shall be individually driven such that failure of one will not affect another.

B. Self-Contained Emergency Lighting Unit:

1. Provide compact, wall mounted emergency lighting unit containing the following:
a. Six or 12 volt nickel cadmium battery capable of supplying 50 watts for a period of at least three hours, with guaranteed life of at least five years.

b. FULLY DISCHARGED to FULLY CHARGED period of 12 hours.

c. Two sealed beam 25 watt, fully adjustable lamps mounted on unit.

d. Relay automatically energizing lights upon loss of 120/277 volt, 60 Hz power.

e. Toggle switch in each lamp circuit so that each lamp may be turned off individually.

f. Time delay relay to keep units energized for ten minutes after normal lighting is restored.

g. Protective circuits shall include low voltage battery disconnect, and brownout protection.

h. Each unit shall have diagnostic circuitry which shall constantly monitor the charger performance and battery voltage.

i. Each unit shall be programmed to exercise the battery and check emergency operation by automatically performing a 5 minute discharge/diagnostic test every 28 days and a 30 minute discharge/diagnostic cycle every six months.

PART 3 - EXECUTION

3.01 FIXTURE MOUNTING

A. Provide fixture supports, including supports for any lighting fixtures furnished by others. Design (including the frames) of recessed fixtures shall be compatible with the ceiling construction. Verify the type of ceiling and suspension method prior to ordering fixtures. Architects favorable review of the shop drawings for both the ceiling system and the lighting fixtures, with "No Exception Taken" or "approved" on the Architect's stamp, will not relieve the Contractor of the ceiling/lighting fixture compatibility requirement.

B. Mount pendant fixtures at the heights indicated on the drawings, unless otherwise directed by Architect. Fixture shall be approved earthquake resistant hangers if code required and have movable joints at ceiling and fixture when more than one stem is used per fixture. Support fixtures mounted on suspended ceiling directly from the structure above using a #9 wire. The runner shall not be used in the support linkage, but shall be bypassed with a suitable device.

C. Securely clip or bolt recessed fluorescent fixtures to ceiling support system by a Code approved method.

D. Attach surface fixtures mounted on accessible panel type suspended ceiling to main runner with a positive clamping device made of minimum 14 gauge steel. Rotational spring catches will not be permitted. Attach a suspension wire to the main runners within 6" of the location so that the fixture loads the runner (at least two wires per fixture). Mount fixtures on combustible ceilings on spacers as required by Code unless Code approved for mounting directly on ceiling.
3.02 FIXTURE INSTALLATION

A. Provide outlet boxes for recessed fixtures in a manner approved by the code. Provide appropriately temperature rated insulation for branch wires to recessed fixtures.

B. Provide fixtures in a manner to prevent light leaks. For exterior fixtures provide seals and gasketing to prevent insect entry into the fixtures. If soffit recessed fixtures are not available with a sealed housing, provide effective gasketing for the lens and for the lens trim/soffit surface interface.

3.03 LIGHTING STANDARDS AND BASES (FOOTINGS)

A. Carefully clean out the edges and corners at the bottom of the excavations to give a level compacted floor for the footing. Shape the footing by forms from the top down to 6" below grade.

B. Conduits and anchor bolts shall be held in place with templates or other approved means during placing of concrete, and shall rise vertically in the base.

C. Provide a ½" chamfer around the perimeter of the top of the base and dress the green concrete (sides and top) with a sacking finish. Top surface shall be dead level so the flange of the standard can bear directly against the concrete. Stainless steel shims may be used for minor adjustments required to make the standard plumb by they shall have adequate bearing area against the concrete and shall not extend beyond the flange cover.

D. If the double nut method of plumb adjustment is used, the bottom nuts shall be set-in flush with the top of the footing with only enough blockout around each nut to allow it to spin upward. At completion of plumb adjustment a portion of the edge of flange shall touch the concrete. The space between the flange and the concrete shall be dry-pack grouted.

E. If the flange cover set screws do not bear against the flange because of excessive plumb adjustment, affix an extension piece to the underside of flange to give a solid bearing surface for the set screws.

F. Final pole base installation shall be the manufacturers installation instructions accopnied with product to include material use and installation dimensions.

END OF SECTION
SECTION 16726

WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Wall-box motion sensors.
3. Snap switches and wall-box dimmers.
4. Solid-state fan speed controls.
5. Wall-switch and exterior occupancy sensors.
6. Communications outlets.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings: List of legends and description of materials and process used for pre-marking wall plates.
C. Operation and Maintenance Data: For wiring devices to include in all manufacturers’ packing label warnings and instruction manuals that include labeling conditions.

1.3 QUALITY ASSURANCE

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

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers’ Names: Shortened versions (shown in parentheses) of the following manufacturers’ names are used in other Part 2 articles:

1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).
2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).
5. Or equal.
2.2 STRAIGHT BLADE RECEPTACLES

A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:
   a. Cooper; 5351 (single), 5352 (duplex).
   b. Hubbell; HBL5351 (single), CR5352 (duplex).
   c. Leviton; 5891 (single), 5352 (duplex).
   d. Pass & Seymour; 5381 (single), 5352 (duplex).
   e. Or equal.

2.3 GFCI RECEPTACLES

A. General Description: Straight blade, non-feed through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:
   a. Cooper; GF20.
   b. Pass & Seymour; 2084.
   c. Or equal.

2.4 SNAP SWITCHES

A. Comply with NEMA WD 1 and UL 20.

B. Switches, 120/277 V, 20 A:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:
   a. Cooper; 2221 (single pole), 2222 (two pole), 2223 (three way), 2224 (four way).
   b. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
   c. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
   d. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).
   e. Or equal.

C. Key-Operated Switches, 120/277 V, 20 A:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

2. Products: Subject to compliance with requirements, provide one of the following:

   a. Cooper; 2221L.
   b. Hubbell; HBL1221L.
   c. Leviton; 1221-2L.
   d. Pass & Seymour; PS20AC1-L.
   e. Or equal.

3. Description: Single pole, with factory-supplied key in lieu of switch handle.

2.5 WALL PLATES

A. Single and combination types to match corresponding wiring devices.

   1. Plate-Securing Screws: Metal with head color to match plate finish.
   2. Material for interior Spaces: **Smooth, white, high-impact thermoplastic**.
   3. Material for Damp Locations: **stainless steel** with spring-loaded lift cover, and listed and labeled for use in “wet locations.”

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant **stainless steel** with lockable cover.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

B. Coordination with Other Trades:

   1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
   2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:
   a. Cut back and pigtail, or replace all damaged conductors.
   b. Straighten conductors that remain and remove corrosion and foreign matter.
   c. Pigtailling existing conductors is permitted provided the outlet box is large enough.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the left.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Dimmers:

1. Install dimmers within terms of their listing.
2. Verify that dimmers used for fan speed control are listed for that application.
3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
3.2 IDENTIFICATION

A. Comply with Division 16 Section "Identification for Electrical Systems."

1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with white-filled lettering on black face of plate, and durable wire markers or tags inside outlet boxes.

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Test Instruments: Use instruments that comply with UL 1436.
2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new, and retest as specified above.

END OF SECTION
SECTION 16830
STRUCTURED CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. The contractor shall provide and install a complete and operational structured cabling system for voice and data throughout the project site as specified on the drawings and herein.

B. Section Includes:
   1. Pathways.
   2. UTP cabling.
   3. Multiuser telecommunications outlet assemblies.
   4. Cable connecting hardware, patch panels, and cross-connects.
   5. Telecommunications outlet/connectors.
   7. Cabling administration system.

1.2 HORIZONTAL CABLE DESCRIPTION

A. Horizontal cable and its connecting hardware provide the means of transporting signals between the telecommunications outlet/connector and the horizontal cross-connect located in the communications equipment room. This cabling and its connecting hardware are called “permanent link,” a term that is used in the testing protocols.
   1. TIA/EIA-568-B.1 requires that a minimum of two telecommunications outlet/connectors be installed for each work area.
   2. Horizontal cabling shall contain no more that one transition point or consolidation point between the horizontal cross-connect and the telecommunications outlet/connector.
   3. Bridged taps and splices shall not be installed in the horizontal cabling.

1.3 PERFORMANCE REQUIREMENTS

A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

B. The contractor shall provide at the time of bid references of comparable project types and manufacturers certification as a factory authorized and trained installer.

C. The contractor shall be responsible for obtaining all licenses and permits as required by the local “AHJ”.

D. The contractor shall warranty the entire systems function and performance as specified herein for a period of 15 years from the data of final acceptance.
1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings:
   1. System Labeling Schedules: Electronic and hard copy of labeling schedules, in format selected by Owner.
   2. Cabling administration drawings and printouts.
   3. Wiring diagrams to show typical wiring schematics, including the following:
      b. Patch panels.
      c. Patch cords.
   4. Cross-connects and patch panels. Detail mounting assemblies, and show elevations and physical relationship between the installed components.
   5. Cable tray layout, showing cable tray route to scale, with relationship between the tray and adjacent structural, electrical, and mechanical elements. Include the following:

C. Qualification Data: Provide documentation as a manufacturer trained and authorized installer.

D. Source quality-control reports.

E. Field quality-control reports.

F. Maintenance data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
   1. Layout Responsibility: Preparation of Shop Drawings by an RCDD.
   2. Installation Supervision: Installation shall be under the direct supervision of factory certified installers, who shall be present at all times when Work of this Section is performed at Project site.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.


1.6 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site. Test each pair of UTP cable for open and short circuits.
PART 2 - PRODUCTS

2.1 PATHWAYS

A. Cable Trays:
   1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following:
      a. Cable Management Solutions, Inc.
      b. CPI
      c. Cooper B-Line, Inc.
   2. Cable Tray Materials: Metal, suitable for indoors, and protected against corrosion by electroplated zinc galvanizing.
      a. Ladder Cable Trays: Aluminum 12” wide by 3” deep with maximum ring space of 9”.

B. Conduit and Boxes: Comply with requirements in Division 16 Section "Raceway and Boxes for Electrical Systems." Flexible metal conduit shall not be used.
   1. Outlet boxes shall be no smaller than 2 inches wide, 3 inches high, and 2-1/2 inches deep.

2.2 BACKBOARDS

A. Backboards: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches

2.3 UTP CABLE (Category 6)

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. AMP.
   2. Avaya.
   3. CommScope, Inc.

B. Description: 100-ohm, 4-pair UTP, covered with a blue thermoplastic jacket.
   1. Comply with ICEA S-90-661 for mechanical properties.
   2. Comply with TIA/EIA-568-B.1 for performance specifications.
   4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
      a. Communications, General Purpose: Type CM or CMG
2.4 UTP CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. KRONE Incorporated

B. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-B.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.

C. Patch Panels:
   1. Shall be Krone #6527/1/630 or equal series, 48-way, unshielded.
   2. Patch panels shall be mounted in 19” CPI data rack.
   3. Cabling shall terminate on RJ45 568B termination blocks, (Krone High Density, no substitutions).
   4. Individual termination blocks shall be provided in 8-pair increments to allow 4-pair cable to be terminated to each block.
   5. The products shall have a separate port for patching, testing, and disconnecting that is independent of the insulation displacement contact (IDC).

D. Outlet Terminations:
   1. Shall be Category 6, unshielded, (Krone #6537/1/001/00, no substitutions).
   2. All jacks shall be RJ45 configured for T568B wiring and must exceed the Category 6 NEXT requirements -40dB per TIA/EIA 568A.
   3. Jacks shall be white and provided as individual units.

E. Equipment Terminations:
   1. All equipment port will be connected via individual runs of enhanced category 6 cable to a termination field adjacent to the horizontal cabling field.
   2. Terminations for these cables shall match the performance and model of the terminations used in the horizontal system, (Krone, no substitutions).

F. Patch Cords:
   1. Factory-made, four-pair cables in 48-inch in length at MDF locations terminated with eight-position modular plug at each end (Krone Highband, no substitutions).
   2. Factory-made, four-pair cables in 10'-0” in length at outlet locations terminated with eight-position modular plug at each end (Krone Highband, no substitutions).
   3. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 6 performance. Patch cords shall have latch guards to protect against snagging.
   4. Patch cords shall have color-coded boots for circuit identification.

2.5 TELECOMMUNICATIONS OUTLET/CONNECTORS


B. Outlets: Two port-connector assemblies mounted in single faceplate.

a. Dual data outlet shall be faceplate by Krone type 6644-1-152-01.
b. Quad data outlet shall be faceplate by Krone type 6644-1-154-01.
c. Provide port blanks for any port not in use.

2. Metal Faceplate: Stainless steel with port quantity per plans.
3. For use with snap-in jacks accommodating any combination of UTP work area cords.

a. Flush mounting jacks, positioning the cord at a 45-degree angle.


2.6 Networking Switch:
A. Provide NP Procurve Networking Switch 410g1 series or equal, one (1) per open rack system to include all mounting hardware.

2.7 Equipment Rack:
A. Provide CPI Universal 46353-703 powder coat painted finish, grounding provisions, rear cable management provisions, top and bottom cable access, leveling feet with caters, rack mount shelves with vertical and master cabling section.
   1. Provide cable tray bracing to include seismic bolts to floor and wall.
   2. Provide cable tray with one (1) rack mounted power strip "APC" #NET9RM with nine (9) outlets and one always on outlet with guarded master-on-off switch.
   3. Provide an uninterruptable power supply (UPS), APC 2200va, 120V, rack mounted smart UPS. APC part #SU22OR3X106 with L5-20 plug. Back shall consist of one 20-amp twistlock, two 20-amp, and four 15-amp receptacle, option #SU029RM3U.

2.8 GROUNDING
A. Comply with requirements in Division 16 Section "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors.
   1. Provide ground bus bar kit which shall be 1 / 4" x 1-1/2" copper mounted on insulated stand-offs. Tap bus bar with ten #10-32 N.F. screws.

B. Comply with ANSI-J-STD-607-A.

2.9 IDENTIFICATION PRODUCTS
A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

B. Comply with requirements in Division 26 Section "Identification for Electrical Systems."

2.10 SOURCE QUALITY CONTROL
A. Testing Agency: Engage a qualified testing agency to evaluate cables.
B. Factory test UTP cables on reels according to TIA/EIA-568-B.1.
C. Factory test UTP cables according to TIA/EIA-568-B.2.
D. Cable will be considered defective if it does not pass tests and inspections.
E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 ENTRANCE FACILITIES

A. Coordinate backbone cabling with the protectors and demarcation point provided by communications service provider.

3.2 WIRING METHODS

A. Wiring Method: Install all cables in raceways and cable trays.
B. Comply with requirements for raceways and boxes specified in Division 26 Section "Raceway and Boxes for Electrical Systems."
C. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
D. Wiring within Enclosures: Bundle, lace, and train cables to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.3 INSTALLATION OF PATHWAYS

A. Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A-7.
B. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.
C. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems" for installation of conduits and wireways.
D. Install manufactured conduit sweeps and long-radius elbows whenever possible.
E. Pathway Installation in Communications Equipment Rooms:
   1. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.
   2. Install cable trays to route cables if conduits cannot be located in these positions.
   3. Secure conduits to backboard when entering room from overhead.
   4. Extend conduits 3 inches above finished floor or below finish ceiling.
5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

F. Backboards: Install backboards with 96-inch dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints.

3.4 INSTALLATION OF CABLES

A. Comply with NECA 1.

B. General Requirements for Cabling:
   1. All Cabling shall be in EMT conduit, no exceptions.
   3. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
   4. Install 110-style IDC termination hardware unless otherwise indicated.
   5. Consolidation points may be used only for making a direct connection to telecommunications outlet/connections:
      a. Do not use consolidation point as a cross-connect point, as a patch connection, or for direct connection to workstation equipment.
      b. Locate consolidation points for UTP at least 49 feet from communications equipment room.
   6. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
   7. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
   8. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
   9. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
   10. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable."

C. UTP Cable Installation:
   2. Do not untwist UTP cables more than 1/2 inch from the point of termination to maintain cable geometry.

D. Separation from EMI Sources:
   1. Comply with BICSI TDMM and TIA/EIA-569-A for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
   2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.

4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.

5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.

6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.5 FIRESTOPPING
   A. Comply with TIA/EIA-569-A, Annex A, "Firestopping."
   B. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.6 GROUNDING
   A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
   B. Comply with ANSI-J-STD-607-A.
   C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.
   D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.7 IDENTIFICATION
   A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
   1. Color-code cross-connect fields. Apply colors to voice and data service backboards, connections, covers, and labels.
B. Cable Schedule: Post in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.

C. Cable and Wire Identification:

1. Label each cable within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
2. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
   a. Individually number wiring conductors connected to terminal strips, and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with name and number of particular device as shown.
   b. Label each unit and field within distribution racks and frames.

3. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.

3.8 FIELD QUALITY CONTROL

A. Tests and Inspections:

2. Visually confirm **Category 6** marking of outlets, cover plates, outlet/connectors, and patch panels.
3. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
4. Test UTP backbone copper cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.
   a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
5. UTP Performance Tests:
   a. Test for each outlet and MUTOA. Perform the following tests according to TIA/EIA-568-B.1 and TIA/EIA-568-B.2:
      1) Wire map.
      2) Length (physical vs. electrical, and length requirements).
      3) Insertion loss.
4) Near-end crosstalk (NEXT) loss.
5) Power sum near-end crosstalk (PSNEXT) loss.
6) Equal-level far-end crosstalk (ELFEXT).
7) Power sum equal-level far-end crosstalk (PSELFEXT).
8) Return loss.
9) Propagation delay.
10) Delay skew.

6. Final Verification Tests: Perform verification tests for UTP systems after the complete communications cabling and workstation outlet/connectors are installed.

   a. Voice Tests: These tests assume that dial tone service has been installed. Connect to the network interface device at the demarcation point. Go off-hook and listen and receive a dial tone. If a test number is available, make and receive a local, long distance, and digital subscription line telephone call.

   b. Data Tests: These tests assume the Information Technology Staff has a network installed and is available to assist with testing. Connect to the network interface device at the demarcation point. Log onto the network to ensure proper connection to the network.

B. Document data for each measurement. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.

C. Prepare test and inspection reports.

3.9 DEMONSTRATION

A. Engage a factory-authorized service representative to train

   Owner's maintenance personnel in cable-plant management operations, including changing signal pathways for different workstations, rerouting signals in failed cables, and keeping records of cabling assignments and revisions when extending wiring to establish new workstation outlets.

END OF SECTION